

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE W912PL-04-B-0002		PAGE OF PAGES 1 2									
2. AMENDMENT/ MODIFICATION NO. 0002		3. EFFECTIVE DATE 03 SEP 2004		4. REQUISITION/PURCHASE REQ. NO.									
5. PROJECT NO. (If applicable)		6. ISSUED BY CODE		7. ADMINISTERED BY (If other than Item 6) CODE									
LOS ANGELES DISTRICT, CORPS OF ENGINEERS P.O. BOX 532711 LOS ANGELES, CALIFORNIA 90053-2325		8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)											
						9A. AMENDMENT OF SOLICITATION NO. W912PL-04-B-0002							
										9B. DATED (SEE ITEM 11) 17 SEP 2004 (BID OPENING)			
CODE		FACILITY CODE		10B. DATED (SEE ITEM 13)									

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers tended. ☐ is extended, ☒ is not ex-

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

- (☒) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
- B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
- C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
- D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/~~MODIFICATION~~ (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

1. Replace the following drawings with the following

T02 REV 'B' C07 REV 'B' C08 REV 'B' C09 REV 'B' C10 REV 'B' C11 REV 'B' C12 REV 'B' DB02 REV 'B' DB10 REV 'B' S25 REV 'A'	INDEX TO CONTRACT DRAWINGS ABBREVIATIONS, AND SYMBOLS PLAN AND PROFILE STA 51+40.000 TO STA 49+00.000 PLAN AND PROFILE STA 49+00.000 TO STA 46+00.000 PLAN AND PROFILE STA 46+00.000 TO STA 43+00.000 PLAN AND PROFILE STA 43+00.000 TO STA 40+40.000 PLAN AND PROFILE STA 40+40.000 TO STA 38+00.000 PLAN AND PROFILE STA 38+00.000 TO STA 35+20.000 DEBRIS BASIN GENERAL PLAN CROSS SECTION - BASIN SECTIONS AND DETAILS - EMBANKMENT OUTLET WORKS, INTAKE TOWER-PLAN, SECTIONS AND DETAILS
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Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		(Signature of Contracting Officer)	

W912PL-04-B-0002
SF-30 (AMENDMENT NO. 2)

2 . REPLACE THE EXISTING SPECIFICATION SECTIONS WITH THE FOLLOWING.

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01330b Submittal Register
01355 Environmental Protection
01451 Contractor Quality Control
01702 As-Built Drawings
02230 Clear Site and Remove Obstructions
02300 Earthwork
02316 Excavation, Trenching, and Backfilling for Utilities Systems
02700 Side Drains and Storm Drainage Systems
02741 Hot-Mix Asphalt (HMA) For Roads
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03301 Cast-In-Place Structural Concrete For Civil Works
03361 Soil Cement (SC)
05502 Miscellaneous Metal

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00700	CONTRACT CLAUSES
00800	SPECIAL CONTRACT REQUIREMENTS
00800b	DRAWING INDEX
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02316	EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS
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SECTION 00010

BID SCHEDULE

PART 1 GENERAL

The numerical sequences of the bid items is not meant to determine for the Contractor the sequencing of the work.

1.1 Base Bid

Item	Description	Quantity	Unit	Price	Amount
0001	TRAFFIC CONTROL EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	1.00	LS	\$____.____	\$____.____
0002	DIVERSION AND CONTROL OF WATER EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	1.00	LS	\$____.____	\$____.____
0003	CLEAR SITE AND REMOVE OBSTRUCTIONS, EXCEPT FOR BID ITEM 0040 AND OPTION NO. 1 AND OPTION No. 2	1.00	LS	\$____.____	\$____.____
0004	EXCAVATION CHANNEL, BLM LANDS AND/OR MATERIALS, EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	4,700	m ³	\$____.____	\$____.____
0005	EXCAVATION CHANNEL, NON BLM LAND, EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	91,100	m ³	\$____.____	\$____.____
0006	FLAMINGO DETENTION BASIN REMOVE AND DISPOSE OF DEBRIS LADEN SOILS AS SCRAP	16,900	m ³	\$____.____	\$____.____
0007	COMPACTED FILL, CHANNEL, NON BLM LAND, EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	45,400	m ³	\$____.____	\$____.____
0008	COMPACTED FILL, GRADING EASEMENTS (GE), F-4 CHANNEL AND F-3 CHANNEL AND 5TH CELL STRUCTURE AREA, NON-BLM MATERIALS	40,250	m ³	\$____.____	\$____.____

BASE BID		Unit			
Item	Description	Quantity	Unit	Price	Amount
0009	CONCRETE, OPEN CHANNEL INVERT SLAB EXCEPT FOR OPTION NO. 1 AND OPTION NO. 2	185	m ³	\$____.____	\$____.____
0010	CONCRETE, OPEN CHANNEL WALLS EXCEPT FOR OPTION NO. 1 AND OPTION NO. 2	135	m ³	\$____.____	\$____.____
0011	REINFORCING STEEL EXCEPT FOR OPTION NO. 2	30	t	\$____.____	\$____.____
0012	AGGREGATE BASE COURSE EXCEPT FOR BID ITEM NO. 0091 AND OPTION NO. 2	1,900	t	\$____.____	\$____.____
0013	ASPHALT CONCRETE PAVEMENT EXCEPT FOR OPTION NO. 1 AND OPTION NO. 2	605	t	\$____.____	\$____.____
0014	WEEPHOLE SYSTEM EXCEPT FOR OPTION NO. 1 AND OPTION NO. 2	1.00	LS	\$____.____	\$____.____
0015	TRANSITION WALL STRUCTURE # 1 (F-4 CHANNEL UPSTREAM OF BELTWAY)	1.00	LS	\$____.____	\$____.____
0016	CONFLUENCE STRUCTURE # 1 (F-4 CHANNEL AND PATRICK LATERAL)	1.00	LS	\$____.____	\$____.____
0017	TRANSITION WALL STRUCTURE # 2 (F-4 CHANNEL DOWNSTREAM PATRICK)	1.00	LS	\$____.____	\$____.____
0018	TRANSITION WALL STRUCTURE # 2A (PATRICK LATERAL DOWNSTREAM PATRICK)	1.00	LS	\$____.____	\$____.____
0019	RCB # 1 (PATRICK LATERAL)	1.00	LS	\$____.____	\$____.____
0020	RCB # 2 (F-4 CHANNEL AT PATRICK)	1.00	LS	\$____.____	\$____.____
0021	TRANSITION WALL STRUCTURE # 3 (F-4 CHANNEL UPSTREAM PATRICK)	1.00	LS	\$____.____	\$____.____

BASE BID		Unit			
Item	Description	Quantity	Unit	Price	Amount
0022	CONFLUENCE STRUCTURE # 2 (F-4 CHANNEL AND F-3 CHANNEL AND 5TH CELL)	1.00	LS	\$____.____	\$_____.____
0023	F-4 CHANNEL AND F-3 CHANNEL AND 5TH CELL STRUCTURE	1.00	LS	\$____.____	\$_____.____
0024	INVERT ACCESS RAMP # 1	1.00	LS	\$____.____	\$_____.____
0025	F-3 CHANNEL 4 X RCB, AND 5TH CELL RCB UNDER FORT APACHE STRUCTURE	1.00	LS	\$____.____	\$_____.____
0026	TRANSITION WALL STRUCTURE # 4 (F-3 CHANNEL AND 5TH CELL UPSTREAM FORT APACHE)	1.00	LS	\$____.____	\$_____.____
0027	F-3 CHANNEL INLET STRUCTURE	1.00	LS	\$____.____	\$_____.____
0028	TRANSITION WALL STRUCTURE # 5 (F-4 CHANNEL DOWNSTREAM FORT APACHE)	1.00	LS	\$____.____	\$_____.____
0029	RCB # 3A (F-4 CHANNEL RCB STA. 34+06.655 TO STA. 31+00.000)	1.00	LS	\$____.____	\$_____.____
0030	RCB # 3C (F-4 CHANNEL RCB STA. 52+99.440 TO STA. 45+80.000)	1.00	LS	\$____.____	\$_____.____
0031	TRANSITION WALL STRUCTURE # 6 (F-4 CHANNEL UPSTREAM WARM SPRINGS)	1.00	LS	\$____.____	\$_____.____
0032	INVERT ACCESS RAMP # 2	1.00	LS	\$____.____	\$_____.____
0033	SIDE DRAIN, F-4 CHANNEL STA. 23+60.000 LT 0.915 RCP	1.00	LS	\$____.____	\$_____.____
0034	SIDE DRAIN, F-4 CHANNEL STA. 26+60.000 LT 1.525 X 0.610 RCB	1.00	LS	\$____.____	\$_____.____
0035	SIDE DRAIN, F-4 CHANNEL STA. 29+38.946 RT 0.457 RCP	1.00	LS	\$____.____	\$_____.____

BASE BID				Unit	
Item	Description	Quantity	Unit	Price	Amount
0036	SIDE DRAIN, F-4 CHANNEL STA. 32+17.305 LT 1.525 X 0.610 RCB	1.00	LS	\$____.____	\$____.____
0037	SIDE DRAIN, F-4 CHANNEL STA. 52+89.543 LT 0.457 RCP	1.00	LS	\$____.____	\$____.____
0038	SIDE DRAIN, F-4 CHANNEL STA. 52+35.05 LT 1.219 RCP	1.00	LS	\$____.____	\$____.____
0039	SIDE DRAIN, F-3 CHANNEL STA. 11+70.000 LT 0.760 X 0.460 RCB	1.00	LS	\$____.____	\$____.____
0040	SIDE DRAIN, 5TH CELL STA. 11+60.000 RT 0.610 RCP	1.00	LS	\$____.____	\$____.____
0041	CONCRETE OVERFLOW STRUCTURE	1.00	LS	\$____.____	\$____.____
0042	ROAD DETOURS EXCEPT OPTION NO. 1	1.00	LS	\$____.____	\$____.____
0043	UTILITY CROSSING ITEMS EXCEPT OPTION NO. 1 AND OPTION NO. 2	1.00	LS	\$____.____	\$____.____
0044	ADJUST SEWER MANHOLE FRAMES AND COVERS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	3	EA	\$____.____	\$____.____
0045	SINGLE SWING GATES	1	ea	\$____.____	\$____.____
0046	LADDER SYSTEMS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	1.00	LS	\$____.____	\$____.____
0047	MANHOLES FOR RCB CONDUITS, CULVERTS, AND LATERALS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	1.00	LS	\$____.____	\$____.____
0048	CHAIN LINK FENCE, 1.829 M HIGH 9 GAGE EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	2,180	m	\$____.____	\$____.____

BASE BID		Unit			
Item	Description	Quantity	Unit	Price	Amount
0049	POST AND CABLE RAILING EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	2,110	m	\$____.____	\$____.____
0050	DOUBLE SWING GATES EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	12	ea	\$____.____	\$____.____
0051	PRE-EMERGENT HERBICIDE AND PIGMENTED DUST PALLIATIVE/SOIL STABILIZER ON NON-REVEGETATED AREAS OF CHANNEL EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	12.2	HA	\$____.____	\$____.____
0052	STATION MARKINGS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2	1.00	LS	\$____.____	\$____.____
0053	AS-BUILT DRAWINGS ENTIRE PROJECT	1.00	LS	\$____.____	\$____.____
0054	CLEAR SITE AND REMOVE OBSTRUCTIONS, BID ITEM 0054 ONLY	1.00	LS	\$____.____	\$____.____
0055	STORM WATER POLLUTION PREVENTION FACILITIES, EXCEPT OPTION NO. 1 AND OPTION NO. 2	1.00	LS	\$____.____	\$____.____
SUBTOTAL ESTIMATED AMOUNT OF BASE BID: (Line Items 0001 through 0055)				\$_____.	

1.2 OPTION NO. 1

Item	Description	Quantity	Unit		Amount
			Unit	Price	
1001	TRAFFIC CONTROL OPTION NO. 1	1.00	LS	\$____.____	\$_____.____
1002	DIVERSION AND CONTROL OF WATER OPTION NO. 1	1.00	LS	\$____.____	\$_____.____
1003	CLEAR SITE AND REMOVE OBSTRUCTIONS OPTION NO. 1	1.00	LS	\$____.____	\$_____.____
1004	EXCAVATION CHANNEL, NON-BLM LAND, OPTION NO. 1	45,050	m ³	\$____.____	\$_____.____
1005	EXCAVATION CHANNEL, BLM LANDS, OPTION NO. 1	10,000	m ³	\$____.____	\$_____.____
1006	PROVIDE CHANNEL EXCAVATION SHORING	1.00	LS	\$____.____	\$_____.____
1007	COMPACTED FILL, CHANNEL, NON-BLM LAND, OPTION NO. 1	26,700	m ³	\$____.____	\$_____.____
1008	COMPACTED FILL, CHANNEL, BLM LAND, OPTION NO. 1	6,000	m ³	\$____.____	\$_____.____
1009	RCB # 3B (F-4 CHANNEL RCB STA. 45+80.000 TO STA. 34+06.655)	1.00	LS	\$____.____	\$_____.____
1010	SIDE DRAIN, F-4 CHANNEL STA. 44+56.714 LT 0.457 RCP	1.00	LS	\$____.____	\$_____.____
1011	SIDE DRAIN, F-4 CHANNEL STA. 44+41.469 RT 1.524 X 0.915 RCB	1.00	LS	\$____.____	\$_____.____
1012	SIDE DRAIN, F-4 CHANNEL STA. 36+20.948 RT 1.524 X 0.914 RCB	1.00	LS	\$____.____	\$_____.____
1013	MANHOLES FOR RCB CONDUITS, CULVERTS, AND LATERALS OPTION NO. 1	1.00	LS	\$____.____	\$_____.____

OPTION NO. 1				Unit		
Item	Description	Quantity	Unit	Price	Amount	
1014	PRE-EMERGENT HERBICIDE AND PIGMENTED DUST PALLIATIVE/SOIL STABILIZER ON NON-REVEGETATED AREAS OF OPTION NO. 1	7.3	HA	\$____.____	\$_____.____	
1015	LADDER SYSTEMS OPTION NO. 1	1.00	LS	\$____.____	\$_____.____	
1016	STORM WATER POLLUTION PREVENTION FACILITIES, OPTION NO. 1	1.00	LS	\$____.____	\$_____.____	
1017	ADJUST SEWER MANHOLE FRAMES AND COVERS OPTION NO. 1	2	EA	\$____.____	\$_____.____	
1018	STATION MARKINGS OPTION NO. 1	1.00	LS	\$____.____	\$_____.____	
1019	UTILITY CROSSING ITEMS OPTION NO. 1	1.00	LS	\$____.____	\$_____.____	
1020	ROAD DETOURS OPTION NO. 1	1.00	LS	\$____.____	\$_____.____	
1021	SIDE DRAIN, F-4 CHANNEL STA. 40+00.000 RT 0.457 RCP	1.00	LS	\$____.____	\$_____.____	
1022	SIDE DRAIN, F-4 CHANNEL STA. 38+20.000 LT 0.457 RCP	1.00	LS	\$____.____	\$_____.____	
1023	SIDE DRAIN, F-4 CHANNEL STA. 36+28.610 RT 1.525 X 0.915 RCB	1.00	LS	\$____.____	\$_____.____	
1024	TORTOISE FENCE, OPTION NO. 1 F-4 CHANNEL	620	m	\$____.____	\$_____.____	
1025	TORTOISE FENCE, F-4 DEBRIS BASIN	4,810	m	\$____.____	\$_____.____	
1026	PLANT NURSERY AREA, TEMPORARY	1.00	LS	\$____.____	\$_____.____	
1027	PROVIDE PLANT STORAGE IRRIGATION DURING CONSTRUCTION	1.00	LS	\$____.____	\$_____.____	
1028	SALVAGE, STORE, AND MAINTAIN PLANTS - CACTUS	79	ea	\$____.____	\$_____.____	

OPTION NO. 1

Item	Description	Quantity	Unit		Amount
			Unit	Price	
1029	SALVAGE, STORE, AND MAINTAIN PLANTS - CREOSOTE BUSH	240	ea	\$____.	\$____.
1030	SALVAGE, STORE, AND MAINTAIN PLANTS - WHITE BURSAGE	240	ea	\$____.	\$____.
1031	SALVAGE, STORE, AND MAINTAIN PLANTS - MOHAVE YUCCA	302	ea	\$____.	\$____.
1032	SALVAGE, STORE, AND MAINTAIN PLANTS - MORMON TEA	120	ea	\$____.	\$____.
1033	STRIP AND STOCKPILE TOPSOIL, F-4 DEBRIS BASIN RIGHT OF WAY AND F-4 DEBRIS BASIN TEMPORARY CONSTRUCTION EASEMENT, AND F-4 CHANNEL STAGING AREA, BLM LAND	19,500	m ³	\$____.	\$____.
1034	CLEAR SITE AND REMOVE OBSTRUCTIONS, BLUE DIAMOND AND FLAMINGO DETENTION BASINS	1.00	LS	\$____.	\$____.
1035	BLUE DIAMOND PROVIDE AND PLANT MORMON TEA	324	ea	\$____.	\$____.
1036	BLUE DIAMOND PROVIDE AND PLANT CREOSOTE BUSH	324	ea	\$____.	\$____.
1037	BLUE DIAMOND PROVIDE AND PLANT WHITE BURSAGE	324	ea	\$____.	\$____.
1038	BLUE DIAMOND PROVIDE AND PLANT MOHAVE YUCCA	135	ea	\$____.	\$____.
1039	BLUE DIAMOND PROVIDE AND PLANT HEDGEHOG CACTUS	32	ea	\$____.	\$____.
1040	BLUE DIAMOND PROVIDE AND PLANT PENCIL CHOLLA	32	ea	\$____.	\$____.
1041	BLUE DIAMOND PROVIDE AND PLANT ANDERSON WOLFBERRY	108	ea	\$____.	\$____.

OPTION NO. 1

Item	Description	Quantity	Unit	Unit Price	Amount
1042	BLUE DIAMOND PROVIDE AND PLANT BEAVERTAIL CACTUS	32	ea	\$____.____	\$____.____
1043	BLUE DIAMOND PROVIDE SEEDING AND FERTILIZATION	5.4	HA	\$____.____	\$____.____
1044	BLUE DIAMOND PROVIDE 1 YEAR IRRIGATION AND MAINTENANCE	1.00	LS	\$____.____	\$____.____
1045	FLAMINGO BASIN PROVIDE AND PLANT MORMON TEA	205	ea	\$____.____	\$____.____
1046	FLAMINGO BASIN PROVIDE AND PLANT CREOSOTE BUSH	246	ea	\$____.____	\$____.____
1047	FLAMINGO BASIN PROVIDE AND PLANT WHITE BURSAGE	246	ea	\$____.____	\$____.____
1048	FLAMINGO BASIN PROVIDE AND PLANT HEDGEHOG CACTUS	24	ea	\$____.____	\$____.____
1049	FLAMINGO BASIN PROVIDE AND PLANT PENCIL CHOLLA	24	ea	\$____.____	\$____.____
1050	FLAMINGO BASIN PROVIDE AND PLANT ANDERSON WOLFBERRY	82	ea	\$____.____	\$____.____
1051	FLAMINGO BASIN PROVIDE AND PLANT BEAVERTAIL CACTUS	24	ea	\$____.____	\$____.____
1052	FLAMINGO BASIN PROVIDE SEEDING AND FERTILIZATION	4.1	HA	\$____.____	\$____.____
1053	FLAMINGO BASIN PROVIDE 1 YEAR IRRIGATION AND MAINTENANCE	1.00	LS	\$____.____	\$____.____
1054	ONE YEAR GUARANTEE ON LANDSCAPE WORK AT BLUE DIAMOND BASIN	1.00	LS	\$____.____	\$____.____
1055	ONE YEAR GUARANTEE ON LANDSCAPE WORK AT FLAMINGO BASIN	1.00	LS	\$____.____	\$____.____
1056	BLUE DIAMOND DETENTION BASIN LANDSCAPE FILL	8,300	m ³	\$____.____	\$____.____

OPTION NO. 1

Item	Description	Quantity	Unit	Price	Amount
1057	FLAMINGO DETENTION BASIN LANDSCAPE FILL	1,100	m ³	\$____.____	\$____.____
1058	FLAMINGO DETENTION BASIN AGGREGATE BASE COURSE SERVICE ROAD	1,342	t	\$____.____	\$____.____
1059	ROAD DETOURS AND ROAD RECONSTRUCTION EXCEPT OPTION NO. 1	1.00	LS	\$____.____	\$____.____
SUBTOTAL ESTIMATED AMOUNT OF OPTION NO. 1 BID ITEMS (Line Items 1001 through 1059)				\$_____.	_____

1.3 OPTION NO. 2

Item	Description	Quantity	Unit	Price	Amount
2001	TRAFFIC CONTROL OPTION NO. 2	1.00	LS	\$____.____	\$_____.____
2002	DIVERSION AND CONTROL OF WATER OPTION NO. 2	1.00	LS	\$____.____	\$_____.____
2003	CLEAR SITE AND REMOVE OBSTRUCTIONS, OPTION NO. 2	1.00	LS	\$____.____	\$_____.____
2004	EXCAVATION CHANNEL, NON BLM LAND, OPTION NO. 2	9,500	m ³	\$____.____	\$_____.____
2005	EXCAVATION CHANNEL, BLM LAND, OPTION NO. 2	24,750	m ³	\$____.____	\$_____.____
2006	EXCAVATION F-4 DEBRIS BASIN, BLM LAND	120,700	m ³	\$____.____	\$_____.____
2007	COMPACTED FILL, CHANNEL, BLM LAND, OPTION NO. 2	11,500	m ³	\$____.____	\$_____.____
2008	COMPACTED FILL, F-4 DEBRIS BASIN EMBANKMENT AND INVERT, BLM LAND	45,510	m ³	\$____.____	\$_____.____
2009	MISCELLANEOUS FILL, F-4 DEBRIS BASIN EMBANKMENT AND INVERT, BLM LAND	24,150	m ³	\$____.____	\$_____.____
2010	CONCRETE, OPEN CHANNEL INVERT SLAB OPTION NO. 2	1,665	m ³	\$____.____	\$_____.____
2011	CONCRETE, OPEN CHANNEL WALLS OPTION NO. 2	1,140	m ³	\$____.____	\$_____.____
2012	REINFORCING STEEL OPTION NO. 2	245	t	\$____.____	\$_____.____
2013	AGGREGATE BASE COURSE OPTION NO. 2	1,850	t	\$____.____	\$_____.____
2014	ASPHALT CONCRETE PAVEMENT OPTION NO. 2	450	t	\$____.____	\$_____.____

OPTION NO. 2

Item	Description	Quantity	Unit	Price	Amount
2015	WEEPHOLE SYSTEM OPTION NO. 2	1.00	LS	\$____.____	\$_____.____
2016	TRANSITION WALL STRUCTURE # 7 (F-4 CHANNEL DOWNSTREAM RCB # 4)	1.00	LS	\$____.____	\$_____.____
2017	RCB # 4 (F-4 CHANNEL AT FORT APACHE)	1.00	LS	\$____.____	\$_____.____
2018	TRANSITION WALL STRUCTURE # 8 (F-4 CHANNEL UPSTREAM RCB # 4)	1.00	LS	\$____.____	\$_____.____
2019	INVERT ACCESS RAMP # 3	1.00	LS	\$____.____	\$_____.____
2020	TRANSITION WALL STRUCTURE # 9 (F-4 CHANNEL UPSTREAM RCB # 5)	1.00	LS	\$____.____	\$_____.____
2021	RCB # 5 (F-4 CHANNEL AT FORT APACHE)	1.00	LS	\$____.____	\$_____.____
2022	TRANSITION WALL STRUCTURE # 10 (F-4 CHANNEL UPSTREAM RCB # 5)	1.00	LS	\$____.____	\$_____.____
2023	DEBRIS BASIN EMBANKMENT SOIL CEMENT ARMOR	13,725	m ³	\$____.____	\$_____.____
2024	PORTLAND CEMENT FOR SOIL CEMENT	1,375	t	\$____.____	\$_____.____
2025	POZZOLAN FOR SOIL CEMENT	180	t	\$____.____	\$_____.____
2026	DEBRIS BASIN LOW FLOW OUTLET RCB	1.00	LS	\$____.____	\$_____.____
2027	DEBRIS BASIN LOW FLOW OUTLET TOWER	1.00	LS	\$____.____	\$_____.____
2028	OUTLET CONDUIT SIDE DRAIN STRUCTURE STA. 64+95.108 RT 0.910 X 0.910 RCB	1.00	LS	\$____.____	\$_____.____
2029	SIDE DRAIN, F-4 CHANNEL STA. 60+97.118 RT 0.457 RCP	1.00	LS	\$____.____	\$_____.____

OPTION NO. 2		Unit			
Item	Description	Quantity	Unit	Price	Amount
2030	SIDE DRAIN, F-4 CHANNEL STA. 62+31.759 RT 0.457 RCP	1.00	LS	\$____.____	\$____.____
2031	SIDE DRAIN, F-4 CHANNEL STA. 64+90.674 LT 1.525 RCP (INTO SLOTTED CHAMBER)	1.00	LS	\$____.____	\$____.____
2032	SLOTTED CHAMBER	1.00	LS	\$____.____	\$____.____
2033	MANHOLES FOR RCB CONDUITS, CULVERTS, AND LATERALS OPTION NO. 2	1.00	LS	\$____.____	\$____.____
2034	CHAIN LINK FENCE, 1.829 M HIGH 9 GAGE OPTION NO. 2	2,100	m	\$____.____	\$____.____
2035	POST AND CABLE RAILING OPTION NO. 2	2,065	m	\$____.____	\$____.____
2036	DOUBLE SWING GATES OPTION NO. 2	10	ea	\$____.____	\$____.____
2037	PRE-EMERGENT HERBICIDE AND PIGMENTED DUST PALLIATIVE/SOIL STABILIZER ON NON-REVEGETATED AREAS OF DEBRIS BASIN EMBANKMENT, INVERT, AND CHANNEL OPTION NO. 2	19.0	HA	\$____.____	\$____.____
2038	STATION MARKINGS OPTION NO. 2	1.00	LS	\$____.____	\$____.____
2039	LADDER SYSTEMS OPTION NO. 2	1.00	LS	\$____.____	\$____.____
2040	COMPACTED FILL, GRADING EASEMENTS (GE), F-4 CHANNEL OPTION NO. 2 AREA, NON-BLM MATERIALS	1,100	m ³	\$____.____	\$____.____
2041	PROVIDE IRRIGATION FOR 1 YEAR AFTER CONSTRUCTION AT F-4 DEBRIS BASIN	1.00	LS	\$____.____	\$____.____
2042	ONE YEAR GUARANTEE ON LANDSCAPE WORK AT F-4 DEBRIS BASIN	1.00	LS	\$____.____	\$____.____

OPTION NO. 2		Unit			
Item	Description	Quantity	Unit	Price	Amount
2043	TRANSPLANT TO F-4 BASIN CACTUS	79	ea	\$____.____	\$_____.____
2044	TRANSPLANT TO F-4 BASIN CREOSOTE BUSH	240	ea	\$____.____	\$_____.____
2045	TRANSPLANT TO F-4 BASIN WHITE BURSAGE	240	ea	\$____.____	\$_____.____
2046	TRANSPLANT TO F-4 BASIN MOHAVE YUCCA	302	ea	\$____.____	\$_____.____
2047	TRANSPLANT TO F-4 BASIN MORMON TEA	120	ea	\$____.____	\$_____.____
2048	PLACE TOPSOIL TO FINISH GRADE, F-4 DEBRIS BASIN EMBANKMENT DOWNSTREAM SURFACE	24,150	m³	\$____.____	\$_____.____
2049	SEEDING AND FERTILIZATION, F-4 DEBRIS BASIN EMBANKMENT DOWNSTREAM SURFACE	2.9	HA	\$____.____	\$_____.____
2050	PROVIDE BROWSE PROTECTION F-4 DEBRIS BASIN	480	ea	\$____.____	\$_____.____
2051	SIMULATED DESERT VARNISH ROCK COLOR MITIGATION	1.00	LS	\$____.____	\$_____.____
2052	SOIL SAMPLING AND TESTING FOR FERTILITY, F-4 DEBRIS BASIN	4	ea	\$____.____	\$_____.____
2053	PIGMENTED DUST PALLIATIVE/SOIL STABILIZER ONLY ON REVEGETATED AREAS	2.4	HA	\$____.____	\$_____.____
2054	UTILITY CROSSING ITEMS OPTION NO. 2	1.00	LS	\$____.____	\$_____.____
2055	STORM WATER POLLUTION PREVENTION FACILITIES, OPTION NO. 2	1.00	LS	\$____.____	\$_____.____
2056	CLEAR SITE AND REMOVE OBSTRUCTIONS OPTION NO. 2 DRAWING SHEET DT29	1.00	LS	\$____.____	\$_____.____

OPTION NO. 2				Unit	
Item	Description	Quantity	Unit	Price	Amount
2057	BASIN DIVERSION LEVEE, BLM LAND	1.00	LS	\$____.____	\$_____.____
2058	F-4 BASIN 0.150 STONE / CALICHE	650	m ³	\$____.____	\$_____.____
2059	COMPACTED FILL, CHANNEL, NON-BLM LAND, OPTION NO. 2	5,800	m ³	\$____.____	\$_____.____
2060	SIDE DRAIN, F-4 CHANNEL STA. 59+90.406 RT 0.610 RCP	1.00	LS	\$____.____	\$_____.____
2061	SIDE DRAIN, F-4 CHANNEL STA. 59+29.590 RT 0.610 RCP	1.00	LS	\$____.____	\$_____.____
2062	SIDE DRAIN, F-4 CHANNEL STA. 57+74.586 RT 0.610 RCP	1.00	LS	\$____.____	\$_____.____
2063	SIDE DRAIN, F-4 CHANNEL STA. 56+89.543 RT 0.457 RCP	1.00	LS	\$____.____	\$_____.____
2064	BASIN DEPTH GAGES	1.00	LS	\$____.____	\$_____.____
2065	BASIN STILLING WELL	1.00	LS	\$____.____	\$_____.____

SUBTOTAL ESTIMATED AMOUNT OF OPTION
NO. 2 BID ITEMS \$_____.

(Line Items 2001 through 2065)

TOTAL ESTIMATED AMOUNT: \$_____.

(Base Bid and Option No.1 and No.2 Bid Items)

Abbreviations:

m = meter
m³ = cubic meter
m² = square meter
t = metric ton (1000 kilograms)
ea = each
LS = lump sum
HA = hectare

SECTION 00010 – SOLICITATION CONTRACT FORM

CLAUSES INCORPORATED BY FULL TEXT

1. All extensions of the unit prices shown will be subject to verification by the Government. In case of variation between the unit price and the extension, the unit price will be considered to be the bid.
2. If a modification to a bid based on unit prices is submitted which provides for a lump sum adjustment to the total estimated amount, the application of the lump sum adjustment to each unit price in the Price Schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the Price Schedule.
3. Prices must be submitted on all individual items of the Price Schedule, otherwise the bid will be considered non-responsive and will be rejected.
4. For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the Price Schedule as submitted by the bidder:
 - a. Obviously misplaced decimal points will be corrected;
 - b. In case of discrepancy between the unit price and the extended price, the unit price will govern;
 - c. Apparent errors in extensions of unit prices will be corrected;
 - d. Apparent errors in addition of lump sum and extended prices will be corrected.
5. For the purpose of bid evaluation, the Government will proceed on the assumption that the bidder intends the bid to be evaluated on the basis of unit prices the totals arrived at by the resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.
6. The lump sum "LS" line items in the Price Schedule are not "Estimated Quantity" line items and are not subject to the "Variation in Estimated Quantity" contract clause.
7. The Contract Clause 52.232-27, "Prompt Payment for Construction Contracts" requires that the name and address of the contractor official, to whom payment is to be sent, be the same as that in the contract or in a proper Notice of Assignment.
8. Principal Contracting Officer. The Contracting Officer who signs this contract will be the Principal Contracting Officer for this contract. However, any Contracting Officer assigned to the Los Angeles District, contracting within his authority, may take formal action on this contract when the Principal Contracting Officer is unavailable and the action needs to be taken.
9. Amounts and prices shall be indicated in either words or figures, NOT BOTH.
10. Payment of Electronic Funds Transfer (EFT) is the mandatory method of payment. The Contractors attention is directed to Contract Clause NO. 52.232-33 "Mandatory Information for Electronic Funds Transfer" located in Section 00800.
11. The bidder shall distribute his indirect costs (overhead, profit, bond, etc.,) over all items in the Price Schedule. The Government will review all submitted Price Schedules for any unbalancing of the items. Any submitted Price Schedule determined to be unbalanced may be considered nonresponsive and cause the bidder to be ineligible for contract award.
12. The bidder shall furnish all plant, labor, material, equipment, etc., necessary to perform all work in strict accordance with the terms and conditions set forth in the contract in include all attachments thereto.

13. Some quantities are ESTIMATED, the bidders prices MUST BE FIRM.

14. Bidder is cautioned to check his Price Schedule carefully prior to submission. If the Price Schedule contains unit prices, they should be round off to the second decimal point only NOT EXTENDED FURTHER.

15. Contractor is required to fill in Cage code (Reference Section 00600, entitled "Required Central Contractor Registration" Mar 1998) and DUNS Number (Reference Section 00600, entitled, "Data Universal Numbering System (DUNS) Number" Jun1999) in Block No. 15 on Standard Form 1442, Name and Address Block (Cage Code under Code and DUNS No. under Facility Code respectively).

16. The Government contemplates award on one contract to the responsive, responsible bidder who submits the low bid for the total of all the items in the Bid Schedule.

17. EVALUATION OF OPTIONS: (FAR 52.217-5) (JUL 1990) Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirements. Evaluation of options will not obligate the Government to exercise the option(s).

18. EXERCISE OF OPTIONS. The Government reserves the right to exercise the option(s) by written notice to the Contractor either singularly or in any combination for up to the following calendar days after the Note To Proceed (NTP) without an increase in the Offeror's bid price. Completion of added options shall continue at the same schedule as the Base Bid unless otherwise noted in the SPECIAL CLAUSES, Paragraph 1, COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK.

OPTION NO. 01 – The Government reserves the right to Award Option No. 1 within 160 Calendar Days from Contractor Receipt of Notice to Proceed.

OPTION NO. 02 – The Government reserves the right to Award Option No. 2 within 250 Calendar Days from Contractor Receipt of Notice to Proceed.

19. MANDATORY WORK STOPPAGES – DELETE PARAGRAPH IN ENTIRETY

IFB NO.: W912PL-04-B-0002
CONTRACT NO.:

CERTIFICATE OF CORPORATE PRINCIPAL

1) IF THE OFFEROR IS A JOINT VENTURE, COMPLETE THE FOLLOWING:

_____	_____	_____
(Company Name)	(Signature)	(Title)

_____	_____	_____
(Company Name)	(Signature)	(Title)

_____	_____	_____
(Company Name)	(Signature)	(Title)

2) IF THE OFFEROR IS PARTNERSHIP, LIST FULL NAME OF ALL PARTNERS:

_____	_____	_____
(Company Name)	(Signature)	(Title)

_____	_____	_____
(Company Name)	(Signature)	(Title)

_____	_____	_____
(Company Name)	(Signature)	(Title)

3) IF THE OFFEROR IS A CORPORATION, THE FOLLOWING CERTIFICATION SHOULD BE COMPLETED:

CERTIFICATION AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the corporation named as principal in the within contract; that _____, who signed the said contract on behalf of the principal, was the _____ of the corporation; that I know his signature and that his signature is genuine; and that said contract was duly signed, sealed and attested for in behalf of said corporation by authority of its governing body.

CORPORATE PRINCIPAL

CORPORATE SEAL

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SECTION 00100 – BIDDING SCHEDULE / INSTRUCTIONS TO BIDDERS

CLAUSES INCORPORATED BY FULL TEXT

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***DENOTES CHANGE**

***DENOTES CHANGE**

52.0000-4010 INQUIRIES

Perspective bidders/offers should submit inquiries related to this solicitation by writing or calling the following (collect calls will not be accepted):

- (1) For inquiries of a contractual nature (solicitation requirements, interpretation of contractual language) call:

SANDY HALL (213) 452-3243
For bid results only, call (213) 452-3235.

- (2) All technical questions on the specification or drawings will be submitted in writing to:

US Army Corps of Engineers
ATTN: Huma Nisar, (213) 452-3665
FAX QUESTIONS TO: SANDY HALL (213) 452-4184

(3) Please include the solicitation number, project title and location of project with your questions. Written inquiries must be received by this office not later than 14 calendar days prior to bid opening date/date set for receipt of offers.

(4) Oral explanations or instructions are not binding. Any information given to a bidder/offeror which impacts the bid/offer will be given in the form of a written amendment to the solicitation.

****52.0000-4023 SAFETY REQUIREMENTS**

The bidder's attention is directed to the latest version of U.S Army Corps of Engineers Safety and Health Manual, EM 385-1-1, which will be strictly enforced. This publication may be obtained from the following website address: http://www.hq.usace.army.mil/soh/hqusace_soh.htm or the US Army Engineer District, Los Angeles, ATTN: Safety Office, P.O. Box 532711, Los Angeles, California 90053-2325.

52.209-4501 CONTRACTOR RESPONSIBILITY, PRE-AWARD SURVEY

In order to determine a contractor's responsibility for purposes of contract award in accordance with FAR Part 9, a statement regarding previous experience in performing comparable work, and/or plan to be used in performing the work is required. After the bid opening, the Government will request this information and set a due date for its submission.

52.211-2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) AND DESCRIPTIONS LISTED IN THE ACQUISITION MANAGEMENT SYSTEMS AND DATA REQUIREMENTS CONTROL LIST, DOD 5010.12-L (JAN 2004)

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained--

- (a) From the ASSIST database via the Internet at <http://assist.daps.dla.mil>; or
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****DENOTES CHANGE**

(b) By submitting a request to the--Department of Defense Single Stock Point (DoDSSP), Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Telephone (215) 697-2179, Facsimile (215) 697-1462.

(End of provision)

52.214-3 AMENDMENTS TO INVITATIONS FOR BIDS (DEC 1989)

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid, (3) by letter or telegram, or (4) by facsimile, if facsimile bids are authorized in the solicitation. The Government must receive the acknowledgment by the time and at the place specified for receipt of bids.

(End of provision)

52.214-4 FALSE STATEMENTS IN BIDS (APR 1984)

Bidders must provide full, accurate, and complete information as required by this solicitation and its attachments. The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

(End of provision)

52.214-5 SUBMISSION OF BIDS (MAR 1997)

(a) Bids and bid modifications shall be submitted in sealed envelopes or packages (unless submitted by electronic means) (1) addressed to the office specified in the solicitation, and (2) showing the time and date specified for receipt, the solicitation number, and the name and address of the bidder.

(b) Bidders using commercial carrier services shall ensure that the bid is addressed and marked on the outermost envelope or wrapper as prescribed in subparagraphs (a)(1) and (2) of this provision when delivered to the office specified in the solicitation.

(c) Telegraphic bids will not be considered unless authorized by the solicitation; however, bids may be modified or withdrawn by written or telegraphic notice.

(d) Facsimile bids, modifications, or withdrawals, will not be considered unless authorized by the solicitation.

(e) Bids submitted by electronic commerce shall be considered only if the electronic commerce method was specifically stipulated or permitted by the solicitation.

(End of provision)

52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)

Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the submission of their bids. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective bidder concerning a solicitation will be furnished promptly to all other prospective bidders as an amendment to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective bidders.

(End of provision)

52.214-7 LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF BIDS (NOV 1999)

(a) Bidders are responsible for submitting bids, and any modifications or withdrawals, so as to reach the Government office designated in the invitation for bids (IFB) by the time specified in the IFB. If no time is specified in the IFB, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that bids are due.

(b)(1) Any bid, modification, or withdrawal received at the Government office designated in the IFB after the exact time specified for receipt of bids is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late bid would not unduly delay the acquisition; and--

(i) If it was transmitted through an electronic commerce method authorized by the IFB, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of bids; or

(ii) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of bids and was under the Government's control prior to the time set for receipt of bids.

(2) However, a late modification of an otherwise successful bid that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(c) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the bid wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(d) If an emergency or unanticipated event interrupts normal Government processes so that bids cannot be received at the Government office designated for receipt of bids by the exact time specified in the IFB and urgent Government requirements preclude amendment of the IFB, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(e) Bids may be withdrawn by written notice received at any time before the exact time set for receipt of bids. If the IFB authorizes facsimile bids, bids may be withdrawn via facsimile received at any time before the exact time set for receipt of bids, subject to the conditions specified in the provision at 52.214-31, Facsimile Bids. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for receipt of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

(End of provision)

****52.0214-4583 TELEGRAPHIC BIDS/OFFERS ARE NOT ACCEPTABLE**

Any telegram to modify or withdraw a bid/offer sent to this office must be physically delivered to the office designated for receipt of bid/offer by the date and time set for bid opening/receipt of proposals. No one from this office will be dispatched to the local telegraph office to pick up any telegram for any reason.

52.214-18 PREPARATION OF BIDS--CONSTRUCTION (APR 1984)

- (a) Bids must be (1) submitted on the forms furnished by the Government or on copies of those forms, and (2) manually signed. The person signing a bid must initial each erasure or change appearing on any bid form.
- (b) The bid form may require bidders to submit bid prices for one or more items on various bases, including--
 - (1) Lump sum bidding;
 - (2) Alternate prices;
 - (3) Units of construction; or
 - (4) Any combination of subparagraphs (1) through (3) above.
- (c) If the solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "no bid" in the space provided for any item on which no price is submitted.
- (d) Alternate bids will not be considered unless this solicitation authorizes their submission.

(End of provision)

52.214-19 CONTRACT AWARD--SEALED BIDDING--CONSTRUCTION (AUG 1996)

- (a) The Government will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the Government, considering only price and the price-related factors specified elsewhere in the solicitation.
- (b) The Government may reject any or all bids, and waive informalities or minor irregularities in bids received.
- (c) The Government may accept any item or combination of items, unless doing so is precluded by a restrictive limitation in the solicitation or the bid.

****DENOTES CHANGE**

(d) The Government may reject a bid as nonresponsive if the prices bid are materially unbalanced between line items or subline items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Government even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

(End of provision)

52.214-34 SUBMISSION OF OFFERS IN THE ENGLISH LANGUAGE (APR 1991)

Offers submitted in response to this solicitation shall be in the English language. Offers received in other than English shall be rejected.

(End of provision)

52.214-35 SUBMISSION OF OFFERS IN U.S. CURRENCY (APR 1991)

Offers submitted in response to this solicitation shall be in terms of U.S. dollars. Offers received in other than U.S. dollars shall be rejected.

(End of provision)

52.0214-4583 TELEGRAPHIC BIDS/OFFERS ARE NOT ACCEPTABLE

Any telegram to modify or withdraw a bid/offer sent to this office must be physically delivered to the office designated for receipt of bid/offer by the date and time set for bid opening/receipt of proposals. No one from this office will be dispatched to the local telegraph office to pick up any telegram for any reason.

52.0214-4599 EVALUATION FOR AWARD

The Government contemplates award of one contract to the responsive, responsible bidder who submits the low bid for the total of all the items in the Bidding Schedule.

52.214-5000 APPARENT CLERICAL MISTAKES (MAR 1995)--EFARS

(a) For the purpose of initial evaluations of bids, the following will be utilized in the resolving arithmetic discrepancies found on the face of bidding schedule as submitted by the bidder:

- (1) Obviously misplaced decimal points will be corrected;
- (2) Discrepancy between unit price and extended price, the unit price will govern;

- (3) Apparent errors in extension of unit prices will be corrected;
 - (4) Apparent errors in addition of lump-sum and extended prices will be corrected.
 - (b) For the purpose of bid evaluation, the government will proceed on the assumption that the bidder intends his bid to be evaluated on basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.
 - (c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.
- (End of statement)

52.0214-5001 DIRECTIONS FOR SUBMITTING BIDS (APR 2002)

Envelopes containing bids must be sealed, marked and addressed as follows:

MARK ENVELOPES:

Bid under IFB No. W912PL-04-B-0002
Bid Opening Date: 17 SEPTEMBER 2004 AT 1:00 P.M.

ADDRESS ENVELOPES TO:

Department of the Army
U. S. Army Engineer District, Los Angeles
ATTN: Contracting Division CESPL-CT-E
C/O: SANDY HALL, (213) 452-3243
P. O. Box 532711
Los Angeles, CA 90053-2325

SPECIAL INSTRUCTIONS PERTAINING TO HAND-CARRIED BIDS:

Due to security precautions, all Corps of Engineers visitors/couriers are now required to check in at the Public Affairs Office (PAO), Suite 980, Wilshire Blvd, Los Angeles, CA. Bidders are no longer permitted to hand-carry their bids directly to Contracting Division without an authorized escort. **Bids may NOT be left unattended at the Public Affairs Office (PAO), Suite 980.**

Bidders who desire to hand-deliver their bids prior to the scheduled bid opening time/date must notify the Contracting Division to arrange for receipt of their bid by Contracting Division personnel. Normally the contact will be the Contract Specialist designated above. In the event the Contract Specialist cannot be reached, please call the main Contracting Division telephone number, 213-452-3231 or the following alternative telephone numbers - 3233, -3245, -3234, or -3235, in order to request assistance.

30 minutes prior to the scheduled bid opening time/date, the Bid Opening Officer will be in the Public Affairs Office (PAO) Suite 980, to accept bids. After visitor in-processing, all bidders will subsequently be escorted to Bid Opening Room, where the bids will be publicly opened and read.

In order to expedite visitor processing, bidders are encouraged to complete the information requested on the Notice of Visitor(s) Form (attached). The completed form can be faxed to the Contract Specialist at (213)452-4184 or 4187, prior to the date for receipt of bids. In addition, no more than 2 visitors per firm will be permitted within the building. No exceptions will be made. The offeror is responsible for compliance with the security requirements and shall ensure that any company representative, courier or delivery personnel are aware of these special procedures pertaining to hand carried bids.

NOTICE OF VISITOR(S)		
1. Date(s) of Visit (<i>Inclusive</i>)		2. Arrival Time
3. Name of Visitor(s) (<i>Last, First</i>)		4. Agency/Company of Visitor
5. Name of Person Being Visited (<i>Include Div, Br, Sec</i>)	6. Suite Number	7. Telephone Number
8. Contact Person (<i>if other than Person Being Visited</i>)		9. Telephone Number
10. Other Comments or Instructions		
<ul style="list-style-type: none"> - All visitors must report to the Public Affairs Office, Suite 980 - Visitors must use the Visitor Tag provided. - Visitors must be escorted to Corps of Engineers floors - Parking validation is only available for Engineering Division, Construction-Operations, and Information Management field personnel. - Delivery personnel will be validated for 30 minutes only. 		

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a FIRM FIXED PRICE contract resulting from this solicitation.

(End of clause)

52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 2000)

(a) It is the policy of the United States that small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

Definitions. As used in this contract--

HUBZone small business concern means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

Service-disabled veteran-owned small business concern--

(1) Means a small business concern--

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

Small business concern means a small business as defined pursuant to Section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto.

Small disadvantaged business concern means a small business concern that represents, as part of its offer that--

- (1) It has received certification as a small disadvantaged business concern consistent with 13 CFR part 124, subpart B;
- (2) No material change in disadvantaged ownership and control has occurred since its certification;
- (3) Where the concern is owned by one or more individuals, the net worth of each individual upon whom the certification is based does not exceed \$750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and
- (4) It is identified, on the date of its representation, as a certified small disadvantaged business in the database maintained by the Small Business Administration (PRO-Net).

Veteran-owned small business concern means a small business concern--

- (1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and
- (2) The management and daily business operations of which are controlled by one or more veterans.

Women-owned small business concern means a small business concern--

- (1) That is at least 51 percent owned by one or more women, or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and
- (2) Whose management and daily business operations are controlled by one or more women.
- (d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as a small business concern, a veteran-owned small business concern, a service-disabled veteran-owned small business concern, a HUBZone small business concern, a small disadvantaged business concern, or a women-owned small business concern.

(End of clause)

52.217-5 EVALUATION OF OPTIONS (JUL 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

(End of provision)

52.219-9 SMALL BUSINESS SUBCONTRACTING PLAN (JAN 2002)

- (a) This clause does not apply to small business concerns.
- (b) Definitions. As used in this clause--

Commercial item means a product or service that satisfies the definition of commercial item in section 2.101 of the Federal Acquisition Regulation.

Commercial plan means a subcontracting plan (including goals) that covers the offeror's fiscal year and that applies to the entire production of commercial items sold by either the entire company or a portion thereof (e.g., division, plant, or product line).

Individual contract plan means a subcontracting plan that covers the entire contract period (including option periods), applies to a specific contract, and has goals that are based on the offeror's planned subcontracting in support of the specific contract, except that indirect costs incurred for common or joint purposes may be allocated on a prorated basis to the contract.

Master plan means a subcontracting plan that contains all the required elements of an individual contract plan, except goals, and may be incorporated into individual contract plans, provided the master plan has been approved.

Subcontract means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) The offeror, upon request by the Contracting Officer, shall submit and negotiate a subcontracting plan, where applicable, that separately addresses subcontracting with small business, veteran-owned small business, HUBZone small business concerns, small disadvantaged business, and women-owned small business concerns. If the offeror is submitting an individual contract plan, the plan must separately address subcontracting with small business, veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns, with a separate part for the basic contract and separate parts for each option (if any). The plan shall be included in and made a part of the resultant contract. The subcontracting plan shall be negotiated within the time specified by the Contracting Officer. Failure to submit and negotiate the subcontracting plan shall make the offeror ineligible for award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business, veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of--

(i) Total dollars planned to be subcontracted for an individual contract plan; or the offeror's total projected sales, expressed in dollars, and the total value of projected subcontracts to support the sales for a commercial plan;

(ii) Total dollars planned to be subcontracted to small business concerns;

(iii) Total dollars planned to be subcontracted to veteran-owned small business concerns;

(iv) Total dollars planned to be subcontracted to HUBZone small business concerns;

(v) Total dollars planned to be subcontracted to small disadvantaged business concerns; and

(vi) Total dollars planned to be subcontracted to women-owned small business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to--

- (i) Small business concerns;
- (ii) Veteran-owned small business concerns;
- (iii) HUBZone small business concerns;
- (iv) Small disadvantaged business concerns; and
- (v) Women-owned small business concerns.

(4) A description of the method used to develop the subcontracting goals in paragraph (d)(1) of this clause.

(5) A description of the method used to identify potential sources for solicitation purposes (e.g., existing company source lists, the Procurement Marketing and Access Network (PRO-Net) of the Small Business Administration (SBA), veterans service organizations, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, HUBZone, small disadvantaged, and women-owned small business trade associations). A firm may rely on the information contained in PRO-Net as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small, veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business source list. Use of PRO-Net as its source list does not relieve a firm of its responsibilities (e.g., outreach, assistance, counseling, or publicizing subcontracting opportunities) in this clause.

(6) A statement as to whether or not the offeror included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with—

- (i) Small business concerns;
- (ii) Veteran-owned small business concerns;
- (iii) HUBZone small business concerns;
- (iv) Small disadvantaged business concerns; and
- (v) Women-owned small business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that small business, veteran-owned small business, HUBZone small business, small disadvantaged business and women-owned small business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause of this contract entitled "Utilization of Small Business Concerns" in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) that receive subcontracts in excess of \$500,000 (\$1,000,000 for construction of any public facility) to adopt a subcontracting plan that complies with the requirements of this clause.

(10) Assurances that the offeror will--

- (i) Cooperate in any studies or surveys as may be required;

(ii) Submit periodic reports so that the Government can determine the extent of compliance by the offeror with the subcontracting plan;

(iii) Submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with paragraph (j) of this clause. The reports shall provide information on subcontract awards to small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, small disadvantaged business concerns, women-owned small business concerns, and Historically Black Colleges and Universities and Minority Institutions. Reporting shall be in accordance with the instructions on the forms or as provided in agency regulations.

(iv) Ensure that its subcontractors agree to submit SF 294 and SF 295.

(11) A description of the types of records that will be maintained concerning procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of the offeror's efforts to locate small business, veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated)

(i) Source lists (e.g., PRO-Net), guides, and other data that identify small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small business, veteran-owned small business, HUBZone small business, small disadvantaged business, or women-owned small business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than \$100,000, indicating--

(A) Whether small business concerns were solicited and, if not, why not;

(B) Whether veteran-owned small business concerns were solicited and, if not, why not;

(C) Whether HUBZone small business concerns were solicited and, if not, why not;

(D) Whether small disadvantaged business concerns were solicited and, if not, why not;

(E) Whether women-owned small business concerns were solicited and, if not, why not; and

(F) If applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact--

(A) Trade associations;

(B) Business development organizations;

(C) Conferences and trade fairs to locate small, HUBZone small, small disadvantaged, and women-owned small business sources; and

(D) Veterans service organizations.

(v) Records of internal guidance and encouragement provided to buyers through--

(A) Workshops, seminars, training, etc.; and

(B) Monitoring performance to evaluate compliance with the program's requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having commercial plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the Contractor's lists of potential small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns in all "make-or-buy" decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business firms.

(4) Provide notice to subcontractors concerning penalties and remedies for misrepresentations of business status as small, veteran-owner small business, HUBZone small, small disadvantaged, or women-owned small business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.

(f) A master plan on a plant or division-wide basis that contains all the elements required by paragraph (d) of this clause, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided--

(1) the master plan has been approved, (2) the offeror ensures that the master plan is updated as necessary and provides copies of the approved master plan, including evidence of its approval, to the Contracting Officer, and (3) goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g) A commercial plan is the preferred type of subcontracting plan for contractors furnishing commercial items. The commercial plan shall relate to the offeror's planned subcontracting generally, for both commercial and Government business, rather than solely to the Government contract. Commercial plans are also preferred for subcontractors that provide commercial items under a prime contract, whether or not the prime contractor is supplying a commercial item.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization Of Small Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.

(j) The Contractor shall submit the following reports:

(1) Standard Form 294, Subcontracting Report for Individual Contracts. This report shall be submitted to the Contracting Officer semiannually and at contract completion. The report covers subcontract award data related to this contract. This report is not required for commercial plans.

(2) Standard Form 295, Summary Subcontract Report. This report encompasses all of the contracts with the awarding agency. It must be submitted semi-annually for contracts with the Department of Defense and annually for contracts with civilian agencies. If the reporting activity is covered by a commercial plan, the reporting activity must report annually all subcontract awards under that plan. All reports submitted at the close of each fiscal year (both individual and commercial plans) shall include a breakout, in the Contractor's format, of subcontract awards, in whole dollars, to small disadvantaged business concerns by North American Industry Classification System (NAICS) Industry Subsector. For a commercial plan, the Contractor may obtain from each of its subcontractors a predominant NAICS Industry Subsector and report all awards to that subcontractor under its predominant NAICS Industry Subsector.

(End of clause)

52.225-11 BUY AMERICAN ACT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (JUN 2004)

(a) Definitions. As used in this clause--

Component means an article, material, or supply incorporated directly into a construction material.

Construction material means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

Cost of components means--

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

Designated country means any of the following countries: Aruba, Austria, Bangladesh, Belgium, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Canada, Cape Verde, Central African Republic, Chad, Comoros, Cyprus, Czech Republic, Denmark, Djibouti, Equatorial Guinea, Estonia, Finland, France, Gambia, Germany, Greece, Guinea, Guinea-Bissau, Haiti, Hong Kong, Hungary, Ireland, Israel, Italy, Japan, Kiribati, Korea, Republic of, Latvia, Lesotho, Liechtenstein, Lithuania, Luxembourg, Malawi, Maldives, Mali, Malta, Mozambique, Nepal, Netherlands, Niger, Norway, Poland, Portugal, Rwanda, Sao Tome and Principe, Sierra Leone, Singapore, Slovak Republic, Slovenia, Somalia, Spain, Sweden, Switzerland, Tanzania U.R., Togo, Tuvalu, Uganda, United Kingdom, Vanuatu, Western Samoa, Yemen.

Designated country construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of a designated country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

Domestic construction material means--

- (1) An unmanufactured construction material mined or produced in the United States; or
- (2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

Foreign construction material means a construction material other than a domestic construction material.

Free Trade Agreement country means Canada, Chile, Mexico, or Singapore.

Free Trade Agreement country construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of a Free Trade Agreement (FTA) country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a FTA country into a new and different construction material distinct from the materials from which it was transformed.

United States means the 50 States, the District of Columbia, and outlying areas.

(b) Construction materials. (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act and Free Trade Agreements (FTAs) apply to this acquisition. Therefore, the Buy American Act restrictions are waived for designated country and FTA country construction materials.

(2) The Contractor shall use only domestic, designated country, or NAFTA country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows: NONE

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that--

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent;

(ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) Request for determination of inapplicability of the Buy American Act.

(1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including--

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American Act applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act applies, use of foreign construction material is noncompliant with the Buy American Act.

(d) Data. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) \1\
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Item 1:

Foreign construction material....

Domestic construction material...

Item 2:

Foreign construction material....
 Domestic construction material....

\1\ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).
 List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.
 Include other applicable supporting information.

(e) United States law will apply to resolve any claim of breach of this contract.

(End of clause)

52.225-12 NOTICE OF BUY AMERICAN ACT REQUIREMENT-- CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (JAN 2004)

(a) Definitions. Construction material, designated country construction material, domestic construction material, foreign construction material, and FTA country construction material, as used in this provision, are defined in the clause of this solicitation entitled "Buy American Act --Construction Materials under Trade Agreements" (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) Requests for determination of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American Act should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) Evaluation of offers. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) Alternate offers. (1) When an offer includes foreign construction material, other than designated country or FTA country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic, designated country, or FTA country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic, designated country, or FTA country construction material, and the offeror shall be required to furnish such domestic, designated country, or FTA country construction material. An offer based on use of the foreign construction material for which an exception was requested--

(i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or

(ii) May be accepted if revised during negotiations.

(End of provision)

52.228-1 BID GUARANTEE (SEP 1996)

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

(b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.-

(c) The amount of the bid guarantee shall be 20 percent of the bid price or \$3,000,000.00, whichever is less.

(d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.-

(e) In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.

(End of clause)

52.228-4506 INDIVIDUAL SURETIES IN SUPPORT OF BID BONDS

Bidder/offerors utilizing individual sureties in support of a bid bond shall include a Standard Form (SF) 28 (Affidavit of Individual Surety), accompanied by a pledge of acceptable assets from each person acting as an individual surety, and include these with the SF 24 (Bid Bond), and the bid itself (see clause titled "Pledges of Assets," FAR 52.228-11).

Pledges of acceptable assets shall be in the form of (1) evidence of an escrow account and/or (2) a recorded lien on real estate. If this is an RFP, failure to provide required documentation described herein may cause the offeror to be deemed "unacceptable".

52.228-4507 BID GUARANTEE FORM AND AMOUNT

When bids/proposals exceed \$100,000, the offeror shall furnish a separated bid guarantee in accordance with the solicitation provision titled "Bid Guarantee", FAR 52.228-1. In accordance with FAR 28.101-2 the bid guarantee amount shall be a least 20 percent of the "bid price" but shall not exceed \$3 million. When the penal sum is expressed as a percentage, a maximum dollar limitation may be stated. If there are option line items on the Pricing Schedule (Schedule B), the term "bid price" is hereby defined as the total bid not to include any amount for line items designated as "options". In bids/proposals that contain "additives", the "bid price" is defined as the total of all bid items including additive line items. FAR 28.106-1 states that a Standard Form (SF) 24 shall be used for the bid bond. In accordance with FAR 28.202(a)(1), corporate sureties utilized must appear on the list contained in the Department of Treasury Circular 570 titled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and Acceptable Reinsuring Companies."

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995) – ALTERNATE I (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) An organized site visit has been scheduled for--
 1 September 2004 at 10:00 A.M.
 P.O.C.: Robert Caskie, 702/252-4160

(c) Participants will meet at--
 Southwest Corner of Warm Springs and Ft. Apache, Nevada

(End of provision)

52.252-5 AUTHORIZED DEVIATIONS IN PROVISIONS (APR 1984)

(a) The use in this solicitation of any Federal Acquisition Regulation (48 CFR Chapter 1) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the provision.

(b) The use in this solicitation of any _____ (48 CFR Chapter _____) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

(End of provision)

252.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992)

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term supplies is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) Representation. The Offeror represents that it:

____ (1) Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

____ (2) Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of provision)

PIL 2003-06, 19 FEB 03, SECURITY CONTRACT LANGUAGE FOR ALL CORPS OF ENGINEERS
UNCLASSIFIED CONTRACTS

All Contractor employees (U.S. citizens and Non-U.S. citizens) working under this contract (*to include grants, cooperative agreements and task orders*) who require access to Automated Information Systems (AIS), (stand along computers, network computers/systems, email) shall, at a minimum, be designated into an ADP-III position (non-sensitive) in accordance with DoD 5220-22-R, Industrial Security Regulation. The investigative requirements for an ADP-III position are a favorable National Agency Check (NAC), SF-85P, Public Trust Position. The contractor shall have each applicable employee complete a SF-85P and submit to the Los Angeles District, ATTN: CESPL, P.O. Box 532711, Los Angeles, California 90053-2325 Security Officer within three (3) working days after award of any contract or task order, and shall be submitted prior to the individual being permitted access to an AIS. Contractors that have a commercial or government entity (CAGE) Code and Facility Security Clearance through the Defense Security Service shall process the NAC's and forward visit requests/results of NAC to the Sergeant Major Jeffrey Koontz, Security Officer. For those contractors that do not have a CAGE Code or Facility Security Clearance, the USAED-L.A., P.O. Box 532711, CESPL-DE-S, Los Angeles, California 90053-2325 Security Office will process the investigation in coordination with the Contractor and contract employees.

In accordance with Engineering Regulation, ER 380-1-18, Section 4, foreign nationals who work on Corps of Engineers' contracts or task orders shall be approved by the HQUSACE Foreign Disclosure Officer or higher before beginning work on the contract/task order. This regulation includes subcontractor employees. (NOTE: exceptions to the above requirement include foreign nationals who perform janitorial and/or ground maintenance services). The contractor shall submit to the Division/District Contract Office, the names of all foreign nationals proposed for performance under this contract/task order, along with documentation to verify that he/she was legally admitted in the United States and has authority to work and/or go to school in the U.S. Such documentation may include a US passport, Certificate of US citizenship (INS Form N-560 or N-561), Certificate of Naturalization (INS Form N-550 or N-570), foreign passport with I-551 stamp or attached INS Form I-94 indicating employment authorization, Alien Registration Receipt Card with photograph (INS Form I-151 or I-551), Temporary Resident Card (INS Form I-688), Employment Authorization Card (INS Form I-688A), Reentry Permit (INS Form I-327), Refugee Travel Document (INS Form I-571), Employment Authorization Document issued by the INS which contains a photograph (INS Form I-688B).

Classified contracts require the issuance of a DD Form 254 (Department of Defense Contract Security Classification Specification).

(End of Clause)

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****DENOTES CHANGE**

Section 00800 - Special Contract Requirements

CLAUSES INCORPORATED BY FULL TEXT

52.0001-4001 CONTRACT ADMINISTRATION DATA

The Contract Administration Office for this contract subsequent to award is:

Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 532711, SPLCT-E
Los Angeles, California 90053-2325

ATTN: SANDY HALL

Telephone No: (213) 452-3243

Payment will be made by:

USACE Finance Center
ATTN: CEFC-AO-P
5270 Integrity Drive
Millington, TN 38054-5005

Submit Invoices to:

USAED – L.A.
TROPICANA PROJECT OFFICE
4440 SO. DURANGO DRIVE, BLDG. B, SUITE D
LAS VEGAS, NEVADA 89117-8672
ATTN: ROBERT CASKIE

****52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)**

The Contractor shall be required to (a) commence work under this contract FOR THE BASE BID ITEMS within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 540 calendar days after the contractor receives the Notice to Proceed . The time stated for completion shall include final cleanup of the premises.

OPTION NO. 01 – The Government reserves the right to Award Option No. 1 within 160 Calendar Days from Contractor Receipt of Notice to Proceed.

OPTION NO. 02 – The Government reserves the right to Award Option No. 2 within 250 Calendar Days from Contractor Receipt of Notice to Proceed.

THE COMPLETION TIME OF 540 DAYS REMAINS THE SAME FOR BOTH OPTION NO'S. 1 AND 2

****DENOTES CHANGE**

THE TIME FOR COMPLETION OF OPTION NO'S. 1 AND 2 SHALL BE WITHIN THE 540 CALENDAR DAYS AS STATED ABOVE.

(End of clause)

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of \$2,362.00 for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

52.211-13 TIME EXTENSIONS (SEP 2000)

Time extensions for contract changes will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements related to the changed work and that the remaining contract completion dates for all other portions of the work will not be altered. The change order also may provide an equitable readjustment of liquidated damages under the new completion schedule.

(End of clause)

52.211-18 VARIATION IN ESTIMATED QUANTITY (APR 1984)

If the quantity of a unit-priced item in this contract is an estimated quantity and the actual quantity of the unit-priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85 percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the Contracting Officer within 10 days from the beginning of the delay, or within such further period as may be granted by the Contracting Officer before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Contracting Officer shall ascertain the facts and make an adjustment for extending the completion date as, in the judgement of the Contracting Officer, is justified.

52.214-29 ORDER OF PRECEDENCE--SEALED BIDDING (JAN 1986)

Any inconsistency in this solicitation or contract shall be resolved by giving precedence in the following order: (a) the Schedule (excluding the specifications); (b) representations and other instructions; (c) contract clauses; (d) other documents, exhibits, and attachments; and (e) the specifications.

(End of clause)

52.219-16 LIQUIDATED DAMAGES-SUBCONTRACTING PLAN (JAN 1999)

(a) Failure to make a good faith effort to comply with the subcontracting plan, as used in this clause, means a willful or intentional failure to perform in accordance with the requirements of the subcontracting plan approved under the clause in this contract entitled "Small Business Subcontracting Plan," or willful or intentional action to frustrate the plan.

(b) Performance shall be measured by applying the percentage goals to the total actual subcontracting dollars or, if a commercial plan is involved, to the pro rata share of actual subcontracting dollars attributable to Government contracts covered by the commercial plan. If, at contract completion or, in the case of a commercial plan, at the close of the fiscal year for which the plan is applicable, the Contractor has failed to meet its subcontracting goals and the Contracting Officer decides in accordance with paragraph (c) of this clause that the Contractor failed to make a good faith effort to comply with its subcontracting plan, established in accordance with the clause in this contract entitled "Small Business Subcontracting Plan," the Contractor shall pay the Government liquidated damages in an amount stated. The amount of probable damages attributable to the Contractor's failure to comply shall be an amount equal to the actual dollar amount by which the Contractor failed to achieve each subcontract goal.

(c) Before the Contracting Officer makes a final decision that the Contractor has failed to make such good faith effort, the Contracting Officer shall give the Contractor written notice specifying the failure and permitting the Contractor to demonstrate what good faith efforts have been made and to discuss the matter. Failure to respond to the notice may be taken as an admission that no valid explanation exists. If, after consideration of all the pertinent data, the Contracting Officer finds that the Contractor failed to make a good faith effort to comply with the subcontracting plan, the Contracting Officer shall issue a final decision to that effect and require that the Contractor pay the Government liquidated damages as provided in paragraph (b) of this clause.

(d) With respect to commercial plans, the Contracting Officer who approved the plan will perform the functions of the Contracting Officer under this clause on behalf of all agencies with contracts covered by the commercial plan.

(e) The Contractor shall have the right of appeal, under the clause in this contract entitled Disputes, from any final decision of the Contracting Officer.

(f) Liquidated damages shall be in addition to any other remedies that the Government may have.

(End of clause)

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
25.0% to 30.0%	6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in

the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

- (1) Name, address, and telephone number of the subcontractor;
- (2) Employer's identification number of the subcontractor;
- (3) Estimated dollar amount of the subcontract;
- (4) Estimated starting and completion dates of the subcontract; and
- (5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Las Vegas, Clark County, Nevada.
(End of provision)

52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if--

- (a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government.
- (b) Any surety fails to furnish reports on its financial condition as required by the Government;
- (c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or
- (d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the Contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting officer has the right to immediately draw on the ILC.

(End of clause)

52.228-12 Prospective Subcontractor Requests for Bonds. (OCT 1995)

In accordance with Section 806(a)(3) of Pub. L. 102-190, as amended by Sections 2091 and 8105 of Pub. L. 103-355, upon the request of a prospective subcontractor or supplier offering to furnish labor or material for the performance of this contract for which a payment bond has been furnished to the Government pursuant to the Miller Act, the Contractor shall promptly provide a copy of such payment bond to the requester.

(End of clause)

52.228-14 IRREVOCABLE LETTER OF CREDIT (DEC 1999)

(a) "Irrevocable letter of credit" (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration date that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal at least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d) Only federally insured financial institutions rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the

required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of less than \$25 million in the past year, ILCs over \$5 million must be confirmed by another acceptable financial institution that had letter of credit business of less than \$25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

[Issuing Financial Institution's Letterhead or Name and Address]

Issue Date _____

IRREVOCABLE LETTER OF CREDIT NO. _____

Account party's name _____

Account party's address _____

For Solicitation No. _____ (for reference only)

TO: [U.S. Government agency]

[U.S. Government agency's address]

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States \$ _____. This Letter of Credit is payable at [issuing financial institution's and, if any, confirming financial institution's] office at [issuing financial institution's address and, if any, confirming financial institution's address] and expires with our close of business on _____, or any automatically extended expiration date.

2. We hereby undertake to honor your or the transferee's sight draft(s) drawn on the issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution, if any, otherwise state of issuing financial institution].

6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

[Issuing financial institution]

(f) The following format shall be used by the financial institution to confirm an ILC:

[Confirming Financial Institution's Letterhead or Name and Address]

(Date) _____

Our Letter of Credit Advice Number _____

Beneficiary: _____ [U.S. Government agency]

Issuing Financial Institution: _____

Issuing Financial Institution's LC No.: _____

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by _____ [name of issuing financial institution] for drawings of up to United States dollars _____/U.S. \$ _____ and expiring with our close of business on _____ [the expiration date], or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at _____.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution].

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

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AMENDMENT NO. 02

 [Confirming financial institution]

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:

SIGHT DRAFT

 [City, State]

(Date) _____

[Name and address of financial institution]

Pay to the order of _____ [Beneficiary Agency] _____ the sum of United States \$ _____.
 This draft is drawn under Irrevocable Letter of Credit No. _____.

 [Beneficiary Agency]

By: _____

(End of clause)

52.228-15 PERFORMANCE AND PAYMENT BONDS--CONSTRUCTION (JUL 2000)-

(a) Definitions. As used in this clause--

Original contract price means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) Amount of required bonds. Unless the resulting contract price is \$100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance bonds (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) Payment Bonds (Standard Form 25-A). The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) Additional bond protection. (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) Surety or other security for bonds. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW, 2nd Floor, West Wing, Washington, DC 20227.

(e) Notice of subcontractor waiver of protection (40 U.S.C. 270b(c)). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.

(End of clause)

**52.231-4001 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995)
EFARS 52-231-5000**

(a) Allowable costs for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule," Region VII. Working conditions shall be considered to be average for determining equipment rates using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retrospective pricing, the schedule in effect at the time the work was performed shall apply.

(b) Equipment rental costs are allowable, subject to the provision of FAR 31.105(d)(ii) and FAR 31.205-36 substantiated by certified copies of paid invoices. Rates for equipment rented from an organization under common control, lease-purchase or sale-leaseback arrangements will be determined using the schedule except that rental costs leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees are allowable. Costs for major repairs and overhaul are unallowable.

(c) When actual equipment costs are proposed and the total amount of the pricing action is over \$25,000, cost or pricing data shall be submitted on Standard Form 1411, "Contract Pricing Proposal Cover Sheet." By submitting cost or pricing data, the contractor grants to the contracting officer or an authorizing representative the right to examine those books, records, documents and other supporting data that will permit evaluation of the proposed equipment costs. After price agreement the contractor shall certify that the equipment costs of pricing data submitted are accurate, complete and current.

(End of clause)

**52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER—CENTRAL CONTRACTOR
REGISTRATION (OCT 2003)**

(a) Method of payment. (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term "EFT" refers to the funds transfer and may also include the payment information transfer.

Section 00800-10

(2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either--

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) Contractor's EFT information. The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.

(c) Mechanisms for EFT payment. The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.

(d) Suspension of payment. If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) Liability for uncompleted or erroneous transfers. (1) If an uncompleted or erroneous transfer occurs because the Government used the Contractor's EFT information incorrectly, the Government remains responsible for--

(i) Making a correct payment;

(ii) Paying any prompt payment penalty due; and

(iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and--

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions of paragraph (d) of this clause shall apply.

(f) EFT and prompt payment. A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.

(g) EFT and assignment of claims. If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register separately in the CCR database and shall be paid by EFT in accordance with the terms of this clause. Notwithstanding any other requirement of this contract, payment to an ultimate recipient other than the Contractor, or a financial institution properly recognized under an assignment of claims pursuant to subpart 32.8, is not permitted. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a

proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(h) Liability for change of EFT information by financial agent. The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.

(i) Payment information. The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.

(End of Clause)

52.232-4001 CONTINUING CONTRACTS (ALTERNATE) (MAR 1995) EFARS 52-232-5002

(a) Funds are not available at the inception of this contract to cover the entire contract price. The sum of \$10,000.00 has been reserved for this contract and is available for payment to the contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds, together with funds provided by one or more non-federal project sponsors will be reserved for this contract. The liability of the United States for payment beyond the funds reserved for this contract is contingent on the reservation of additional funds.

(b) Failure to make payment in excess of the amount currently reserved, or that may be reserved from time to time, shall not be considered a breach of this contract, and shall not entitle the contractor to a price adjustment under the terms of this contract except as specifically provided in paragraphs (e) and (h) below.

(c) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The contracting officer will promptly notify the contractor of any additional funds reserved for the contract by issuing and administrative modification to the contract.

(d) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the contractor shall give written notice to the contracting officer of the estimated date of exhaustion and of additional funds which will be needed to meet payments due or to become due under this contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated date of exhaustion.

(e) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. If and when sufficient additional funds are reserved, the contractor shall be entitled to simple interest on any payment that the contracting officer determines was actually earned under the terms of this contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat 97, as in effect on the first day of the delay in such payment.

(f) Any suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the contractor to any price adjustment under a "Suspension of Work" or similar clause or in any other manner under this contract.

(g) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.

(h) If, upon the expiration of sixty (60) days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, the contractor, by written notice delivered to the contracting officer at any time before such additional funds are reserved, may elect to treat his right to proceed with the work as having been terminated. Such

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a termination shall be at no cost to the Government, except that, to the extent that additional funds to make payment therefore are allocated to this contract, it may be treated as a termination for the convenience of the Government.

(i) If at any time it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the contractor because of work performed and to be performed under this contract during the fiscal year, the Government reserves the right, after notice to the contractor, to reduce said reservation by the amount of such excess.

(j) The term "Reservation" means monies that have been set aside and made available for payments under this contract.

(End of clause)

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least 35% percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(End of clause)

52.236-4 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by Surveys and Test borings.

(b) Weather conditions - The contractor shall satisfy himself as to the hazards likely to arise from weather conditions.

(c) Transportation facilities - The contractor shall make his own investigation of the conditions of existing public and private roads and clearances, restrictions, bridge load limits and other limitations affecting transportation and ingress and egress at the job site. The unavailability of transportation facilities or limitations thereof shall not become a basis for claims against the Government or extensions of time for completion of the work.

(d) N/A.

(End of clause)

52.236-14 AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)

(a) The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the

Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

(End of clause)

52.236-16 QUANTITY SURVEYS (APR 1984)

(a) Quantity surveys shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

(b) The Government shall conduct the original and final surveys and make the computations based on them. The Contractor shall conduct the surveys for any periods for which progress payments are requested and shall make the computations based on these surveys. All surveys conducted by the Contractor shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance.

(c) Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The Contractor shall retain copies of all such material furnished to the Contracting Officer.

(End of clause)

52.236-17 LAYOUT OF WORK (APR 1984)

The Contractor shall lay out its work from Government established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

(End of clause)

52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved",

"acceptable", "satisfactory", or words of like import shall mean "approved by," or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed".

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements, and (2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

(End of clause)

52.0236-4001 PLANT AND MATERIAL REMOVAL AFTER CONTRACT TERMINATION (MAR 1996) EFARS 52.236-5000

Should this contract be terminated as provided in clause 52.232-5001 because of the failure of Congress to provide additional funds for its completion, the contractor may be permitted to remove plant and material on which payments for preparatory work have been made, subject to an equitable deduction from the amounts due the contractor to reimburse the United States for the unabsorbed value of such plant and material.

(End of clause)

52.248-3 VALUE ENGINEERING--CONSTRUCTION (FEB 2000)

(a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) below.

(b) Definitions. "Collateral costs," as used in this clause, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

"Instant contract savings," as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs, including subcontractors' development and implementation costs (see paragraph (h) below).

"Value engineering change proposal (VECP)" means a proposal that--

- (1) Requires a change to this, the instant contract, to implement; and
- (2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change--

- (i) In deliverable end item quantities only; or

- (ii) To the contract type only.

(c) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

- (1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

- (2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

- (3) A separate, detailed cost estimate for

- (i) the affected portions of the existing contract requirement and

- (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) below.

- (4) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

- (5) A prediction of any effects the proposed change would have on collateral costs to the agency.

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(6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) Submission. The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.

(e) Government action.

(1) The Contracting Officer will notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer will notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it shall not be liable for any delay in acting upon a VECP.

If the VECP is not accepted, the Contracting Officer will notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The decision to accept or reject all or part of any VECP is a unilateral decision made solely at the discretion of the Contracting Officer.

(f) Sharing.

(1) Rates. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by

(i) 45 percent for fixed-price contracts or

(ii) 75 percent for cost-reimbursement contracts.

(2) Payment. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to--

(i) Accept the VECP;

(ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and

(iii) Provide the Contractor's share of savings by adding the amount calculated to the contract price or fee.

(g) Collateral savings. If a VECP is accepted, the Contracting Officer will increase the instant contract amount by 20 percent of any projected collateral savings determined to be realized in a typical year of use after subtracting any Government costs not previously offset. However, the Contractor's share of collateral savings will not exceed the contract's firm-fixed-price or estimated cost, at the time the VECP is accepted, or \$100,000, whichever is greater. The Contracting Officer is the sole determiner of the amount of collateral savings.

(h) Subcontracts. The Contractor shall include an appropriate value engineering clause in any subcontract of \$50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's

price under paragraph (f) above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that these payments shall not reduce the Government's share of the savings resulting from the VECP.

(i) Data. The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

"These data, furnished under the Value Engineering-- Construction clause of contract, shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations." If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)

(End of clause)

52.249-4001 BASIS FOR SETTLEMENT OF PROPOSALS EFARS 52.249-5000

Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total costs basis, the following principals will be applied to determine allowable equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable and unallowable expenses will be used to determine equipment operating expenses. ³

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

(End of Statement)

252.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (AUG 2000)

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer.

(b) The Contractor shall--

- (1) Check all drawings furnished immediately upon receipt;
 - (2) Compare all drawings and verify the figures before laying out the work;
 - (3) Promptly notify the Contracting Officer of any discrepancies;
 - (4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and
 - (5) Reproduce and print contract drawings and specifications as needed.
- (c) In general--
- (1) Large-scale drawings shall govern small-scale drawings; and
 - (2) The Contractor shall follow figures marked on drawings in preference to scale measurements.
- (d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.
- (e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

Title	File	Drawing No.
SEE DRAWING LIST		

(End of clause)

252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAY 2002)

- (a) Definitions. As used in this clause --
- (1) "Components" means articles, materials, and supplies incorporated directly into end products at any level of manufacture, fabrication, or assembly by the Contractor or any subcontractor.
 - (2) "Department of Defense" (DoD) means the Army, Navy, Air Force, Marine Corps, and defense agencies.
 - (3) "Foreign flag vessel" means any vessel that is not a U.S.-flag vessel.
 - (4) "Ocean transportation" means any transportation aboard a ship, vessel, boat, barge, or ferry through international waters.
 - (5) "Subcontractor" means a supplier, materialman, distributor, or vendor at any level below the prime contractor whose contractual obligation to perform results from, or is conditioned upon, award of the prime contract and who is performing any part of the work or other requirement of the prime contract.
 - (6) "Supplies" means all property, except land and interests in land, that is clearly identifiable for eventual use by or owned by the DoD at the time of transportation by sea.
- (i) An item is clearly identifiable for eventual use by the DoD if, for example, the contract documentation contains a reference to a DoD contract number or a military destination.

(ii) "Supplies" includes (but is not limited to) public works; buildings and facilities; ships; floating equipment and vessels of every character, type, and description, with parts, subassemblies, accessories, and equipment; machine tools; material; equipment; stores of all kinds; end items; construction materials; and components of the foregoing.

(7) "U.S.-flag vessel" means a vessel of the United States or belonging to the United States, including any vessel registered or having national status under the laws of the United States.

(b)(1) The Contractor shall use U.S.-flag vessels when transporting any supplies by sea under this contract.

(2) A subcontractor transporting supplies by sea under this contract shall use U.S.-flag vessels if--

(i) This contract is a construction contract; or

(ii) The supplies being transported are--

(A) Noncommercial items; or

(B) Commercial items that--

(1) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it contracts for f.o.b. destination shipment);

(2) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or

(3) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(c) The Contractor and its subcontractors may request that the Contracting Officer authorize shipment in foreign-flag vessels, or designate available U.S.-flag vessels, if the Contractor or a subcontractor believes that --

(1) U.S.-flag vessels are not available for timely shipment;

(2) The freight charges are inordinately excessive or unreasonable; or

(3) Freight charges are higher than charges to private persons for transportation of like goods.

(d) The Contractor must submit any request for use of other than U.S.-flag vessels in writing to the Contracting Officer at least 45 days prior to the sailing date necessary to meet its delivery schedules. The Contracting Officer will process requests submitted after such date(s) as expeditiously as possible, but the Contracting Officer's failure to grant approvals to meet the shipper's sailing date will not of itself constitute a compensable delay under this or any other clause of this contract. Requests shall contain at a minimum --

(1) Type, weight, and cube of cargo;

(2) Required shipping date;

(3) Special handling and discharge requirements;

(4) Loading and discharge points;

(5) Name of shipper and consignee;

(6) Prime contract number; and

(7) A documented description of efforts made to secure U.S.-flag vessels, including points of contact (with names and telephone numbers) with at least two U.S.-flag carriers contacted. Copies of telephone notes, telegraphic and facsimile message or letters will be sufficient for this purpose.

(e) The Contractor shall, within 30 days after each shipment covered by this clause, provide the Contracting Officer and the Maritime Administration, Office of Cargo Preference, U.S. Department of Transportation, 400 Seventh Street SW., Washington, DC 20590, one copy of the rated on board vessel operating carrier's ocean bill of lading, which shall contain the following information:

- (1) Prime contract number;
- (2) Name of vessel;
- (3) Vessel flag of registry;
- (4) Date of loading;
- (5) Port of loading;
- (6) Port of final discharge;
- (7) Description of commodity;
- (8) Gross weight in pounds and cubic feet if available;
- (9) Total ocean freight in U.S. dollars; and
- (10) Name of the steamship company.

(f) The Contractor shall provide with its final invoice under this contract a representation that to the best of its knowledge and belief--

- (1) No ocean transportation was used in the performance of this contract;
- (2) Ocean transportation was used and only U.S.-flag vessels were used for all ocean shipments under the contract;
- (3) Ocean transportation was used, and the Contractor had the written consent of the Contracting Officer for all non-U.S.-flag ocean transportation; or
- (4) Ocean transportation was used and some or all of the shipments were made on non-U.S.-flag vessels without the written consent of the Contracting Officer. The Contractor shall describe these shipments in the following format:

ITEM DESCRIPTION	CONTRACT LINE ITEMS	QUANTITY
_____	_____	_____
_____	_____	_____
_____	_____	_____
TOTAL	_____	_____

(g) If the final invoice does not include the required representation, the Government will reject and return it to the Contractor as an improper invoice for the purposes of the Prompt Payment clause of this contract. In the event there has been unauthorized use of non-U.S.-flag vessels in the performance of this contract, the Contracting Officer is entitled to equitably adjust the contract, based on the unauthorized use.

(h) In the award of subcontracts for the types of supplies described in paragraph (b)(2) of this clause, the Contractor shall flow down the requirements of this clause as follows:

(1) The Contractor shall insert the substance of this clause, including this paragraph (h), in subcontracts that exceed the simplified acquisition threshold in part 2 of the Federal Acquisition Regulation.

(2) The Contractor shall insert the substance of paragraphs (a) through (e) of this clause, and this paragraph (h), in subcontracts that are at or below the simplified acquisition threshold in part 2 of the Federal Acquisition Regulation.

(End of clause)

SECTION 00800b
DRAWING INDEX

SHEET NUMBER	CAL FILENAME	CADD FILENAME	REVISION NUMBER	DESCRIPTION
T01	T01.CAL	214/057.1		VICINITY MAP, PROJECT LOCATION MAP
T02	T02.CAL	214/058.1	REV.'B'	INDEX TO CONTRACT DRAWINGS, ABBREVIATIONS, AND SYMBOLS
T03	T03.CAL	214/059.1		CONTROL POINTS, ABBREVIATIONS, AND SYMBOLS
T04	T04.CAL	214/060.1		SURVEY CONTROL MAP
T05	T05.CAL	214/061.1		SURVEY CONTROL MAP
T06	T06.CAL	214/062.1		WORK LIMITS, STA 66+74.000 TO STA.DGN 65+20.000
T07	T07.CAL	214/063.1	REV.'B'	WORK LIMITS, STA 65+20.000 TO STA.DGN 58+80.000
T08	T08.CAL	214/064.1	REV.'B'	WORK LIMITS, STA 58+80.000 TO STA.DGN 51+60.000
T09	T09.CAL	214/065	REV.'B'	WORK LIMITS, STA 51+60.DGN000 TO STA.DGN 44+60.DGN000
T10	T10.CAL	214/066.1	REV.'B'	WORK LIMITS, STA 44+60.000 TO STA.DGN 37+40.000
T11	T11.CAL	214/067.1	REV.'B'	WORK LIMITS, STA 37+40.000 TO STA.DGN 30+60.000
T12	T12.CAL	214/068.1	REV.'B'	WORK LIMITS, STA 30+60.000 TO STA.DGN 24+60.000
T13	T13.CAL	214/069.1		WORK LIMITS, STA 24+60.000 TO STA.DGN 23+07.000
T14	T14.CAL	214/070.1		DISPOSAL SITE
C01	C01.CAL	214/071.1		PLAN AND PROFILE, STA. 66+74.475 TO STA. 65+00.000
C02	C02.CAL	214/072.1		PLAN AND PROFILE, STA. 65+00.000 TO STA. 62+00.000
C03	C03.CAL	214/073.1		PLAN AND PROFILE, STA. 62+00.000 TO STA. 59+40.000
C04	C04.CAL	214/074.1		PLAN AND PROFILE, STA. 59+40.000 TO STA. 56+80.000
C05	C05.CAL	214/075.1		PLAN AND PROFILE, STA. 56+80.000 TO STA. 54+20.000
C06	C06.CAL	214/076.1		PLAN AND PROFILE, STA. 54+20.000 TO STA. 51+40.000
C07	C07.CAL	214/077.1		PLAN AND PROFILE, STA. 51+40.000 TO STA. 49+00.000
C08	C08.CAL	214/078.1		PLAN AND PROFILE, STA. 49+00.000 TO STA. 46+00.000
C09	C09.CAL	214/079.1		PLAN AND PROFILE, STA. 46+00.000 TO STA. 43+00.000
C10	C10.CAL	214/080.1		PLAN AND PROFILE, STA. 43+00.000 TO STA. 40+40.000
C11	C11.CAL	214/081.1		PLAN AND PROFILE, STA. 40+40.000 TO STA. 38+00.000
C12	C12.CAL	214/082.1		PLAN AND PROFILE, STA. 38+00.000 TO STA. 35+20.000
C13	C13.CAL	214/083.1		PLAN AND PROFILE, STA. 35+20.000 TO STA. 32+80.000
C14	C14.CAL	214/084.1		PLAN AND PROFILE, STA. 32+80.000 TO STA. 29+80.000
C15	C15.CAL	214/085.1		PLAN AND PROFILE, STA. 29+80.000 TO STA. 27+00.000
C16	C16.CAL	214/086.1		PLAN AND PROFILE, STA. 27+00.000 TO STA. 25+00.000
C17	C17.CAL	214/087.1		PLAN AND PROFILE, STA. 25+00.000 TO STA. 23+07.420
C18	C18.CAL	214/088.1		PLAN AND PROFILE, F-3 CHANNEL
C19	C19.CAL	214/089.1		PLAN AND PROFILE, 5TH CELL
C20	C20.CAL	214/090.1		PLAN AND PROFILE, PATRICK LATERAL
C21	C21.CAL	214/091.1		F3 GRADING PLAN
C22	C22.CAL	214/092.1		CROSS SECTIONS, STA. 66+60.000 TO STA. 64+80.000
C23	C23.CAL	214/093.1		CROSS SECTIONS, STA. 64+40.000 TO STA. 62+50.000
C24	C24.CAL	214/094.1		CROSS SECTIONS, STA. 62+00.000 TO STA. 60+00.000
C25	C25.CAL	214/095.1		CROSS SECTIONS, STA. 59+00.000 TO STA. 57+00.000
C26	C26.CAL	214/096.1		CROSS SECTIONS, STA. 56+00.000 TO STA. 53+60.000
C27	C27.CAL	214/097.1		CROSS SECTIONS, STA. 53+20.000 TO STA. 51+00.000
C28	C28.CAL	214/098		CROSS SECTIONS, STA. 50+00.000 TO STA. 48+00.000
C29	C29.CAL	214/099.1		CROSS SECTIONS, STA. 47+00.000 TO STA. 45+00.000
C30	C30.CAL	214/100.1		CROSS SECTIONS, STA. 44+40.000 TO STA. 42+00.000
C31	C31.CAL	214/101.1		CROSS SECTIONS, STA. 40+30.000 TO STA. 37+00.000
C32	C32.CAL	214/102.1		CROSS SECTIONS, STA. 36+31.156 TO STA. 35+40.000
C33	C33.CAL	214/103		CROSS SECTIONS, STA. 34+80.000 TO STA. 33+60.000
C34	C34.CAL	214/104.1		CROSS SECTIONS, STA. 32+40.000 TO STA. 31+25.000
C35	C35.CAL	214/105.1		CROSS SECTIONS, STA. 31+00.000 TO STA. 30+00.000
C36	C36.CAL	214/106.1		CROSS SECTIONS, STA. 29+50.000 TO STA. 28+25.000
C37	C37.CAL	214/107.1		CROSS SECTIONS, STA. 27+60.000 TO STA. 25+50.000
C38	C38.CAL	214/108.1		CROSS SECTIONS, STA. 24+50.000 TO STA. 23+60.000
C39	C39.CAL	214/109.1		CROSS SECTIONS, STA. 13+58.286 TO STA. 12+25.000
C40	C40.CAL	214/110.1		CROSS SECTIONS, STA. 12+12.449 TO STA. 11+47.155
C41	C41.CAL	214/111.1		CROSS SECTIONS, STA. 10+90.000 TO STA. 10+05.000
C42	C42.CAL	214/112.1		CONCRETE OVERFLOW STRUCTURE
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DB07	DB07.CAL	214/122.1		CROSS SECTIONS - EMBANKMENT, STA. 10+00.000 TO STA. 11+60.000

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DB08	DB08.CAL	214/123.1		CROSS SECTIONS - EMBANKMENT, STA. 12+40.000 TO STA. 14+00.000
DB09	DB09.CAL	214/124.1	REV. 'B'	CROSS SECTIONS - BASIN, STA. 67+25.000 TO 67+90.000
DB10	DB10.CAL	214/125.1		CROSS SECTIONS - BASIN SECTIONS AND DETAILS - EMBANKMENT
DB11	DB11.CAL	214/126.1		OUTLET WORKS CONDUIT, PLAN AND PROFILE
DB12	DB12.CAL	214/127.1		ACCESS RAMP NO. 1 AND NO. 2, PLAN, PROFILES, AND SECTIONS
DB13	DB13.CAL	214/128.1		ACCESS RAMP NO. 3 AND NO. 4, PLAN, PROFILES, AND SECTIONS
DB14	DB14.CAL	214/129.1		DIVERSION LEVEE AND TORTISE FENCING DETAILS, PLAN, PROFILES, AND SECTION
DB15	DB15.CAL	214/130.1		BASIN DEPTH GAGE AND SEDIMENT STAFF GAGE DETAILS
DB16	DB16.CAL	214/131.1		STILLING WELL DETAILS
DB17	DB17.CAL	214/132.1		STAFF GAGE, STILLING WELL, AND MONUMENT DETAILS
DB18	DB18.CAL	214/133.1		ACCESS RAMP DETAILS
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S03	S03.CAL	214/142.1		BOX CONDUIT SCHEDULE AND DETAILS
S04	S04.CAL	214/143.1		PATRICK CONFLUENCE, PLAN, SECTIONS AND DETAILS
S05	S05.CAL	214/144.1		PATRICK CONFLUENCE, SECTIONS AND DETAILS
S06	S06.CAL	214/145.1		F3 CONFLUENCE, PLAN, SECTIONS, AND DETAILS
S07	S07.CAL	214/146.1		F3 CONFLUENCE, SECTIONS AND DETAILS NO. 1
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S10	S10.CAL	214/149.1		PIER NOSE, SECTIONS AND DETAILS
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S12	S12.CAL	214/151.1		F4 INVERT ACCESS RAMP, PLAN, PROFILE, AND SECTIONS, STA. 53+95.706 TO STA. 53+42.000
S13	S13.CAL	214/152.1		F4 INVERT ACCESS RAMP, PLAN, PROFILE, AND SECTIONS, STA. 62+98.000 TO STA. 62+42.308
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S16	S16.CAL	214/155.1		SIDE DRAIN DETAILS
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S18	S18.CAL	214/157.1		F-3 CONFLUENCE, SECTIONS AND DETAILS NO. 3
S19	SHEET DELETED		SHEET	DELETED
S20	S20.CAL	214/159.1		MANHOLE, COVER, FRAME AND DETAILS
S21	S21.CAL	214/160.1		MANHOLE FOR SLOTTED CHAMBER
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S23	S23.CAL	214/162.1		SEWERLINE @ 5TH CELL, STA. 11+77.396, SECTIONS AND DETAILS
S24	S24.CAL	214/163.1		TRANSITION DETAILS
S25	S25.CAL	214/164.1	REV. 'B'	OUTLET WORKS, INTAKE TOWER PLAN, SECTIONS AND DETAILS
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M02	M02.CAL	214/171		PIPE ACCESS RAMP GATE DETAILS AND SECTIONS
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L04	L04.CAL	214/207		BLUE DIAMOND DETENTION BASIN LANDSCAPE PLAN
L05	L05.CAL	214/208		FLAMINGO DETENTION BASIN LANDSCAPE PLAN
L06	L06.CAL	214/209		FLAMINGO DETENTION BASIN LANDSCAPE PLAN
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DT02	DT02.CAL	214/216		DETOUR ROAD (PHASE 1)
DT03	DT03.CAL	214/217		DETOUR ROAD (PHASE 1)
DT04	DT04.CAL	214/218		SUNSET ROAD DETOUR ROAD (PHASE 2)
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DT07	DT07.CAL	214/221		ROAD RECONSTRUCTION
DT08	DT08.CAL	214/222		ROAD RECONSTRUCTION
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DT17	DT17.CAL	214/231		RECONSTRUCTION SIGNAGE & STRIPING
DT18	DT18.CAL	214/232		RECONSTRUCTION SIGNAGE & STRIPING
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SECTION 01200

GENERAL REQUIREMENTS

PART 1 GENERAL

Definition - Unless otherwise stated, the term "Contractor" is meant to be the Contractor of this Contract Work which includes the F-4 Debris Basin and Channel work and the Blue Diamond Detention Basin Landscaping work and the Flamingo Detention Basin Landscaping work depicted throughout the Specifications and referenced plans.

BLM Land area locations and boundaries are shown on the T sheets.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASME INTERNATIONAL (ASME)

- | | |
|--------------|--|
| ASME B18.2.1 | (1996) Square and Hex Bolts and Screws,
Inch Series |
| ASME B18.2.2 | (1987; R 1993) Square and Hex Nuts |

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

- | | |
|--------------|---|
| CID A-A-2246 | (Rev B) Paint, Latex |
| CID A-A-2336 | (Rev A) Primer Coating (Alkyd, Exterior
Wood, White and Tints) |

DEPARTMENT OF COMMERCE (DOC)

- | | |
|----------|--|
| DOC PS 1 | (1996) Voluntary Product Standard -
Construction and Industrial Plywood |
|----------|--|

ENGINEERING MANUALS (EM)

- | | |
|--------------------|--|
| COE EM 385-1-1 | (3 Nov 2003) Safety and Health
Requirements Manual |
| COE EM 1110-1-1003 | (01 August 96) NAVSTAR Global Positioning
System Survey |
| COE EM 1110-1-1005 | (31 August 94) Topographic Surveying |

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 20

(1994; Addenda January. 1997) American
Softwood Lumber Standards

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Topographic Surveyor; G, RE.

The Topographic Surveyor firm selected by the Contractor must be approved by the Contracting Officer prior to performing surveys for this contract.

Maule Avenue Area Road Traffic and Pedestrian Control Plan; G, RE.

Maule Avenue Area Road Closure Plan; G, RE.

A Traffic and Pedestrian Control Plan and a Maule Avenue Area Road Closure Plan is to be provided and approved by Clark County prior to the Maule Avenue closure and these plans will be updated though the life of the contract.

1.3 PROJECT FACILITIES

The Contractor shall construct and/or erect the following project facilities as soon as possible and not less than 15 calendar days after notice to proceed.

1.3.1 Construction Signs

The signs shall include the following:

- a. Project Signs: One Project Sign at location designated by the Contracting Officer.
- b. Warning Signs: Facing approaching traffic on all haul roads crossing under overhead power transmission lines.
- c. Hard Hat Signs: Ten hard hat signs at locations directed.

1.3.2 Bulletin Board

Bulletin board shall be erected at the Contractor's office.

1.3.3 Sanitary Facilities

Suitable sanitary facilities shall be provided and maintained by the Contractor.

PART 2 PRODUCTS

2.1 CONSTRUCTION SIGNS

2.1.1 Materials

2.1.1.1 Lumber

NIST PS 20, and shall be seasoned Douglas Fir, S4S, Grade D or better except that posts, braces and spacers shall be construction Grade (WCLB).

2.1.1.2 Plywood

DOC PS 1, grade A-C, Group 1, exterior type.

2.1.1.3 Bolts, Nuts and Nails

Bolts shall conform to ASME B18.2.1, nuts shall conform to ASME B18.2.2, and nails shall conform to commercially available supplies.

2.1.1.4 Paints and Oils

Paints shall conform to CID A-A-2336 for primer and CID A-A-2246 for finish paint and lettering.

PART 3 EXECUTION

3.1 CONSTRUCTION OF SIGNS

3.1.1 Project and Hard Hat Signs

Constructed as detailed in Figures 1,2,3 and Safety Signs. Decals signs will be furnished by the Contracting Officer.

3.1.2 Warning Signs

Constructed of plywood not less than 13 mm thick and shall be securely bolted to the supports with the bottom of the sign face 1 m above the ground. The sign face shall be 0.60 m x 1.20 m, all letters shall be 100 mm in height, and the wording shall be: "WARNING: OVERHEAD TRANSMISSION LINES."

3.2 PAINTING SIGNS

All exposed surfaces and edges of plywood shall be given one coat of linseed oil and be wiped prior to applying primer. All exposed surfaces of signs and supports shall be given one coat of primer and 2 finish coats of white paint. Except as otherwise indicated, lettering on all signs shall be black and sized as indicated.

3.3 PROJECT ENGINEER'S OFFICE EQUIPMENT

Contractor shall provide computer software (3.5" floppy disc size) to the Contracting Officer for the type of scheduling system to be used and

quantity/fill programs for tracking or estimating bid quantities during construction. Scheduling software must be capable of downloading completely to the COE Standard Data Exchange Format. The Contractor shall utilize a hand held radio system for communication between the Contractor's quality control representative and the Government's quality assurance representative. Radio equipment for the Government's use shall include a hand held radio, two batteries and one charger. The Contractor shall provide Government personnel with the following equipment for the duration of the contract: 1 Cellular telephone with voice mail, 2 nickel cadmium batteries, 1 desk top charger, 1 travel charger, and 400 minutes of air time per month or portion thereof.

3.4 BULLETIN BOARD

A weatherproof bulletin board, approximately 915 mm wide and 760 mm high, with hinged glass door shall be provided adjacent to or mounted on the Contractor's project office. If adjacent to the office, the bulletin board shall be securely mounted on no less than 2 posts. Bulletin board and posts shall be painted or have other approved factory finish. The bulletin board shall be easily accessible at all times and shall contain wage rates, equal opportunity notice, and such other items required to be posted.

3.5 MAINTENANCE AND DISPOSAL OF PROJECT FACILITIES

The Contractor shall maintain the project facilities in good condition throughout the life of the project. Upon completion of work under this contract, the facilities covered under this section will remain the property of the Contractor and shall be removed from the site at his expense.

3.6 SCRAP MATERIAL

Materials indicated to be removed and not indicated to be salvaged, stored or reinstalled are designated as scrap and shall become the property of the Contractor and be removed from the site of work. The Contractor by signing this contract hereby acknowledges that he made due allowance for value, if any, of such scrap in the contract price.

3.7 ARCHAEOLOGICAL FINDINGS DURING CONSTRUCTION

Should the Contractor or any of his employees in the performance of this contract find or uncover any archaeological remains, he shall notify the Project Engineer immediately. Such notifications will be a brief statement in writing giving the location and nature of the findings. Should the discovery site require archaeological studies resulting in delays and/or additional work, the Contractor will be compensated by an equitable adjustment under the CONTRACT CLAUSES of the contract.

3.8 PROTECTION OF EXISTING WORK

Before beginning any cutting or removal work, the Contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to insure against damage to such work to

remain in place, to be reused, or to remain the property of the Government, and any damage to such work shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall insure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this contract.

3.9 PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS

3.9.1 General

The approximate location of all railroads, pipelines, power and communication lines, and other utilities known to exist within the limits of the work are indicated on the drawings. The sizes, locations, and names of owners of such utilities are given from available information, but their accuracy is not guaranteed. Except as otherwise indicated on the drawings, all existing utilities will be left in place and the Contractor shall conduct his operations in such a manner that the utilities will be protected from damage at all times, or arrangements shall be made by the Contractor for their relocation at the Contractor's own expense. The Contractor shall be responsible for any damage to utilities known to exist and shall reimburse the owners for such damage caused by his operations.

3.9.1.1 Existing Sewer, Water, Irrigation Facilities, Electrical, Telecommunications, and Gas Utilities

Contractor shall protect in place existing sewer, water, irrigation facilities, electrical, telecommunications, and gas utilities within F-4 Debris Basin and Channel permanent Rights-of-Ways (ROW) and Temporary Construction Easements (TCEs), including such utilities which cross beneath the channels. Contractor shall repair any damaged existing sewer, water, irrigation facilities, electrical, telecommunications, and gas utilities within F-4 Debris Basin and Channel permanent ROW and TCE including such facilities which cross beneath the channels, if the damaged utility was damaged by the Contractor's operations. See Section 02300 EARTHWORK, paragraph BLASTING AND UTILITY LINES for additional information.

Contractor shall protect in place existing sewer, water, irrigation facilities, electrical, telecommunications, and gas utilities within Blue Diamond Detention Basin and Flamingo Detention Basin permanent Rights-of-Ways (ROW) and Temporary Construction Easements (TCEs), including such utilities which cross beneath the basins and embankments of these basins. Contractor shall repair any damaged existing sewer, water, irrigation facilities, electrical, telecommunications, and gas utilities within the Blue Diamond Detention Basin and the Flamingo Detention Basin permanent ROW and TCE including such facilities which cross beneath the basins and embankments of these basins, if the damaged utility was damaged by the Contractor's operations. See Section 02300 EARTHWORK, paragraph BLASTING AND UTILITY LINES for additional information.

3.9.2 Relocation or Removal

Utilities to be relocated or removed not as part of this contract are designated "To be Relocated by Others" or "To be Removed by Others", respectively. Utilities shown on the plans and not so designated will be left in place and be subject to the provisions of the CONTRACT CLAUSE: PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS.

The Contractor may make arrangements with the owner for the temporary relocation and restoration of utilities not designated to be relocated, or for additional work in excess of the work needed to relocate utilities designated for relocation at no additional cost to the Government.

3.9.3 Utilities Not Shown

If the Contractor encounters, within the construction limits of the entire project, utilities not shown on the plans and not visible as of the date of this contract and if such utilities will interfere with construction operations, he shall immediately notify the Contracting Officer in writing to enable a determination by the Contracting Officer as to the necessity for removal or relocation. If such utilities are left in place, removed or relocated, as directed by the Contracting Officer, the Contractor shall be entitled to an equitable adjustment for any additional work or delay.

3.9.4 Coordination

The Contractor shall consult and cooperate with the owner of utilities that are to be relocated or removed by others to establish a mutual performance schedule and to enable coordination of such work with the construction work. These consultations shall be held as soon as possible after award of the contract or sufficiently in advance of anticipated interference with construction operations to provide required time for the removal or relocation of affected utilities. **The Las Vegas Valley Water District Point of Contact: Communication Support Center (702) 258-7171.**

3.9.5 Notices

3.9.5.1 Utilities to be Relocated or Protected

Unless otherwise specified, the Contractor shall notify the Contracting Officer, in writing, 14 calendar days prior to starting work on any utility to be relocated or protected. On each relocation, notification shall include dates on which the Contractor plans excavation, by-pass work, removal work and/or installation work, as applicable. The Contractor shall also notify the following representatives of utility owners not less than 7 days prior to the start of work in the vicinity of their respective utilities.

Mr. Steve Jackson
Las Vegas Valley Water
1001 S. Valley View Blvd.
Las Vegas, NV 89153
Telephone: (702) 258-3249

Mr. Bucky Faulkner
Clark County Sanitation District

5857 E. Flamingo Road
Las Vegas, NV
Telephone: (702)434-6601

Mr. Sheridan Green
Southwest Gas Corporation
4300 W. Tropicana Avenue
Las Vegas Nevada
(702) 365-2014
Underground Service Alert
(800) 227-2600

Mr. Dan DeFiesta
Cox Communications
121 S. Martin L. King Blvd.
Las Vegas, NV 89106
(702) 384-8084, ext 8274

Mr. John Merrill
US Sprint
3300 S. Valley View Boulevard
Las Vegas, NV 89152
(702) 244-7838

Ms. Tina Furlong
Nevada Power Company
6770 W. Flamingo Road
Las Vegas, NV 89151
(702) 252-4815

3.9.5.2 Bench Marks and R/W Markers

The Contractor shall notify the Contracting Officer, in writing, 7 days in advance of the time he proposes to remove any existing bench mark or right-of-way marker.

3.9.5.3 ENVIRONMENTAL ASSESSMENT REQUIREMENT

In order to satisfy the Environmental Assessment for this project, the Contracting Officer is required to have a qualified biologist on site at all times while: a) clear site and remove obstructions (clearing and grubbing) operations are in progress, and; b) during basin work involving installation of the tortoise fence and surveying for tortoise and Gila monster after tortoise fence installation. **The Biologist will be provided by the Government.** The Contractor shall notify the Contracting Officer 14 calendar days prior to the start of clearing and grubbing activities and 14 calendar days prior to the start of basin work involving installation of the tortoise fence so that a biological monitor shall be required to walk immediately in front of the Contractors' clearing and grubbing equipment and tortoise fence installation work to survey for the threatened desert tortoise and state protected/ BLM sensitive Gila monster. **For scheduling purposes, the Contractor shall coordinate and complete all clear site and remove obstructions (clearing and grubbing) activities within one five-workday period, and the Contractor shall coordinate and complete all**

tortoise fence installation work activities for the basin and other features on BLM Lands within a ten-workday period.

3.9.5.4 Spill Reporting

The Contractor shall notify the Contracting Officer immediately after any spill, regardless of quantity, including all personnel exposures. The Contractor shall submit a written notification not later than 7 calendar days after the initial notification. The written notification shall include the following:

- a. Item spilled, leaked or releases in an unauthorized manner (Identification, Quantity and Manifest Numbers).
- b. Whether the amount spilled, leaked or released in an unauthorized manner is EPA reportable and, if reported, a copy of the report.
- c. Exact location of the spill, leak or unauthorized release.
- d. Nature of exposure to personnel.
- e. Containment procedures initiated.
- f. Anticipated cleanup and disposal procedure.
- g. Disposal location of spill, leak or unauthorized release residue.

3.9.6 Restrictions

3.9.6.1 Other Agency Representatives

Personnel representing owners and other agencies may be present for various portions of the work. However, the Contractor will be responsible only to the Contracting Officer.

3.9.6.2 Traffic Control Plan

The Contractor shall develop a Traffic Control Plan and obtain an approval from the Clark County Department of Public Works prior to construction. The plan shall include details of truck haul routes.

3.9.6.3 Existing Roads

The construction schedule shall be prepared giving full consideration to maintaining traffic on existing roads. Additional work on the existing roads may be performed by others during the life of this contract.

3.9.6.4 Access and Haul Roads

Access and haul roads shall be proposed so that use of existing residential streets are minimized.

3.9.6.5 Public and Private Roads

When it is necessary to operate on existing roads outside the construction area, all necessary permits shall be obtained from the appropriate private or public authority. Work shall be conducted in such manner so as to obstruct and inconvenience traffic on existing roads outside the construction limits as little as possible. Spillage of earth, dusty materials, boulders, and mud on project roads or other road will not be permitted. If spillage cannot be prevented, the spillage shall be immediately removed and such areas shall be kept clear throughout the workday. At the conclusion of each workday, such traveled areas shall be cleared of spillage, boulders, and mud.

3.9.6.6 Maintenance of Roads

All haul and access roads, within the construction area, including the borrow areas, shall be maintained to provide vehicular access for the Government's vehicles and the Contractor's vehicles and equipment. Road maintenance shall include rock/mud slides, washouts, and any incident which would restrict vehicular/equipment access. Prior to any alterations of any road alignment, the Contractor shall receive an approval from the Contracting Officer. Road maintenance and alterations shall be performed by the Contractor at no additional cost to the Government. **Contractor shall share all haul roads that occupy an alignment with the Fort Apache Right Of Way with others, including the land owners, other contractors, utilities, developers, and public agencies.**

3.9.6.7 Traffic Safety

In accordance with CONTRACT CLAUSE: ACCIDENT PREVENTION, signs, barricades, and warning devices shall be provided, installed, and maintained as are required for protection of vehicular traffic at any location where operations interfere with public roads. Signs, barricades, lights, and signals, shall be in conformance with Part VI of the U.S. Department of Transportation Manual on Uniform Traffic Control Devices for Streets and Highways.

3.9.6.8 Rock and Gravel

Rock and gravel for use on haul roads and other facilities may be obtained from any source within the excavation limits, borrow area, or stockpiles, that are within the project boundaries and are not designated for other use. **The use of any other source shall be subject to any additional requirements within these specifications and to approval by the Contracting Officer.**

3.9.6.9 Cooperation with Others

The Contractor shall coordinate his activities and cooperate with other contractors as to not delay or interfere with their work.

3.9.7 Working Hours

The Contractor shall restrict all construction activities to the following schedule:

Monday thru Friday 6:30 a.m. to 7 p.m.
Saturday 8 a.m. to 7 p.m.

No work will be permitted on Sundays or Federal Holidays without the prior written approval from the Contracting Officer.

Disposal area(s) and haul route(s) utilized by the Contractor may require restricted hauling hours. The Contractor is notified that hauling or disposal activities may be restricted to normal business hours (7 a.m. to 4 p.m. in the event that such operations are considered to be disruptive to existing neighborhood safety and noise conditions. In the event that such a situation develops, the Contracting Officer shall notify the Contractor of restrictive hauling and/or disposal times. The Contractor shall develop their schedule for construction so that restrictive hauling times can be absorbed without extending the overall contract completion period.

3.9.8 Construction Water

The Contractor shall be responsible for obtaining water for construction purposes. The Contractor shall be responsible for obtaining approvals from the Las Vegas Valley Water District (LVVWD) and for coordination with other projects in the area.

3.9.9 Identification of Vehicles

All the Contractor's vehicles shall display suitable permanent identification.

3.9.10 Construction Method Observation

Any construction method, plant, or piece of equipment used on this contract shall not be considered proprietary, and can be inspected or photographed at any time by the Government, regulatory agencies, or any group approved by the Government.

3.9.11 Contractor's Equipment

The planned method of transportation and operation of cranes and other heavy equipment to be used in the performance of this contract shall be submitted for approval by the Contracting Officer. The plan shall include the type, size, loadings of equipment, the proposed transportation routes, and work areas to be used on the project.

3.10 PUBLIC SAFETY

Attention is directed to the CONTRACT CLAUSE: PERMITS AND RESPONSIBILITIES.

The Contractor shall provide temporary fencing, barricades, and/or guards, as required, to provide protection in the interest of public safety. Whenever the Contractor's operations create a condition hazardous to the public, he shall furnish at his own expense and without cost to the Government, such flagmen and guards as are necessary to give adequate warning to the public of any dangerous conditions to be encountered and he shall furnish, erect, or maintain such fences, barricades, lights, signs and other devices as are necessary to prevent accidents and avoid damage or

injury to the public. Flagmen and guards, while on duty and assigned to give warning and safety devices shall conform to applicable city, county, and state requirements. Should the Contractor appear to be neglectful or negligent in furnishing adequate warning and protection measures, the Contracting Officer may direct attention to the existence of a hazard and the necessary warning and protective measures shall be furnished and installed by the Contractor without additional cost to the Government. Should the Contracting Officer point out the inadequacy of warning and protective measures, such action of the Contracting Officer shall not relieve the Contractor from any responsibility for public safety or abrogate his obligation to furnish and pay for those devices. The installation of any general illumination shall not relieve the Contractor of his responsibility for furnishing and maintaining any protective facility.

3.11 OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) STANDARDS

The OCCUPATIONAL SAFETY and HEALTH ACT (OSHA) STANDARDS for CONSTRUCTION (Title 29, Code of Federal Regulations Part 1926 as revised from time to time) and the Corps of Engineers "Safety and Health Requirements Manual", COE EM 385-1-1, are both applicable to this contract. The most stringent requirement of the two standards will be applicable.

3.11.1 Accident Reporting

In accordance with COE EM 385-1-1, the Contractor shall submit a written summary of worker's compensation claims which have been filled by worker's in connection with work on the project. The summary shall be submitted at the time when the work is approximately 50 percent complete and at project completion. The summary shall include all subcontractors. The Contractor's and subcontractor's compensation insurance carrier shall certify that the summaries are "correct and true".

3.12 PERMITS

3.12.1 General

Reference is made to the article of the contract entitled "Permits and Responsibilities", which obligates the Contractor to obtain all required licenses and permits.

3.12.2 Air Pollution Permit (APP)

The Contractor shall obtain an APP from the Clark County Health Department.

A copy of the permit shall be submitted to the Contracting Officer. For further information, contact Ms. Cynthia Mikes at telephone number (702) 383-1276.

3.12.3 National Pollutant Discharge Elimination System (NPDES) Permit

The Contractor shall obtain a NPDES permit from the United States Environmental Protection Agency (USEPA) under the Nation Wide Permit (NWP) program, which requires that a Storm Water Pollution Prevention Plan (SWPPP) shall be prepared and maintained on-site throughout the

construction period. A copy of the plan shall be submitted to the Contracting Officer. In accordance with the NWP, a minimum of two (2) days prior to the start of construction activities, the Contractor shall submit a Notice of Intent (NOI) with fees to the Nevada Division of USEPA. The NOI shall be submitted on the standard EPA Form 3510-6 (8-92), and copies shall be provided to the Contracting Officer. For further information, contact Mr. Robb Saunders at telephone number (775) 687-4670.

3.13 CONTRACTOR SAFETY PERSONNEL REQUIREMENT

3.13.1 General

Full-time, on-site, safety coverage by Contractor shall be required at all times during this contract. The Contractor shall employ at the project site to cover all hours of work at least one Safety and Occupational Health Technician per shift, to manage the Contractor's accident prevention program. In addition, the Contractor shall have one Safety and Occupational Health Professional to manage the overall Safety program. The principal safety person (the Safety Professional) shall report to and work directly for the Contractors on-site top manager, higher level official, or corporate safety office. The Safety and Health staff shall have the authority to take immediate steps to correct unsafe or unhealthful conditions. The presence of a Safety and Health person will not abrogate safety responsibilities of other personnel. The Safety and Health person shall be assigned no other duties.

3.13.2 Qualifications for Safety and Health Professional(s)

- a. Shall have a degree in engineering or safety in at least a four year program from an accredited school and in addition, shall have been engaged in safety and occupational health for at least two (2) years, no time being credited to these two (2) years unless at least fifty (50) percent of the time each year was devoted to safety and occupational health; or
- b. Shall have legal registration as a Professional Engineer, Certified Safety Professional, or a Certified Safety Manager, and, in addition, shall have been engaged in safety and occupational health for at least one (1) year, no time being credited to this one (1) year experience unless at least fifty (50) percent of the time was devoted to safety and occupational health; or
- c. Shall have degree other than that specified in (a) above and in addition, shall have been engaged in safety and occupational health for at least three (3) years, no time being credited to these three (3) years unless at least fifth (5) percent of the time each year was devoted to safety and occupational health; or
- d. In lieu of a degree, shall have been engaged in safety and occupational health for at least five (5) years, no time being credited to these five (5) years unless at least fifty (50) percent of the time each year was devoted to safety and occupational health.
- e. First aid work is not creditable experience.

3.13.3 Qualification for Safety and Health Technicians

- a. A bachelors degree in safety or an associated discipline and currently employed in a safety position; or
- b. An associate degree in Safety or an associated discipline and currently experience in Safety, and currently employed in a safety position; or
- c. Five years field experience in safety or an associated discipline and currently employed in a safety position.
- d. First Aid work is not creditable experience.

3.13.4 Names and Duties

The name and qualifications of nominated safety persons shall be furnished to the Contracting Officer (in resume format) for acceptability. A functional description of duties shall be provided prior to the pre-work conference. In addition, a copy of a letter from an authorized official of the Contractor which describes the duties and authority of the safety professional, including delegating sufficient authority to stop work to immediately correct the unsafe or unhealthful conditions.

3.14 NOTICE OF PARTNERSHIP

The Government intends to encourage the foundation of a cohesive partnership with the Contractor and its subcontractors. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance and intended to achieve completion within budget, on schedule, and in accordance with plans and specifications. This partnership would be bilateral in makeup, and participation will be totally voluntary. Any cost associated with effectuating this partnership will be agreed to by both parties and will be shared equally with no change in contract price. To implement this partnership initiative it is anticipated that within 60 days of Notice to Proceed the Contractor's on-site project manager and the Government's Resident Engineer would attend a two day partnership development seminar/team building workshop together with the Contractor's key on-site staff and key Government personnel. Follow-up workshop of 1 to 2 days duration would be held periodically throughout the duration of the contract as agreed to by the Contractor and Government.

3.15 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (ER 415-1-15, 31 OCT 89)

- a. This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE: DEFAULT (FIXED PRICE CONSTRUCTION). In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

- (1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is,

more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DAYS											
Work Days Based on five (5) Day Work Week											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
9	4	1	1	1	1	4	1	1	1	2	8

c. Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in subparagraph b, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the CONTRACT CLAUSE: DEFAULT (FIXED PRICE CONSTRUCTION).

3.16 REQUIRED INSURANCE

The Contractor shall procure and obtain during the entire period of his performance under this contract the following minimum insurance:

- a. General Public Liability insurance for bodily injury and property damage with minimum limits of \$1,000,000 combined single limit per occurrence and \$1,000,000 annual aggregate for bodily injury to or death, personal injury and property damage.
- b. Automobile Liability insurance for bodily injury and property damage with minimum limits of \$1,000,000 combined single limit for each occurrence and \$1,000,000 annual aggregate.
- c. Either Workman's Compensation or Employer's Liability insurance with a minimum limit of \$1,000,000.

In every case the insurance coverage shall amount to at least the limits

stated above. However, where the Financial Responsibility Compulsory Insurance Law of the State in which the installation is located requires higher limits, the Automobile Liability Insurance Policy should provide coverage of at least those limits. County of Clark, a political subdivision of the state of Nevada, and Clark County Regional Flood Control District and Distinctive Homes At The Springs LLC, a Nevada Limited Liability Company, 2500 W. Sahara Avenue, Suite 111, Las Vegas Nevada 89102 shall be named as additional insured parties and all policies issued in performance of work under this contract.

The Contractor does hereby agree to indemnify, defend, and save harmless Clark County, and Clark County Regional Flood Control District, and Distinctive Homes At The Springs LLC, a Nevada Limited Liability Company, 2500 W. Sahara Avenue, Suite 111, Las Vegas Nevada 89102 from loss, damage, liability, costs, or expense to the proportionate extent caused by the Contractor, his employees, agents, or consultants and/or consultants arising out of its performance of this contract, including, but not limited to the negligent acts, errors, omissions, or intentional misconduct of the Contractor, its employees, agents or consultants and/or sub-consultants in connection with this contract.

Contractor further does hereby agree, as a precaution to the performance of any work under this contract and as a precaution to any obligation of Clark County to make any payment under this contract, to provide Clark County with a certificate and/or a certificate issued by the State Industrial Insurance System (SIIS) in accordance with Nevada Revised Statute 616.280.

Contractor agrees to maintain required workers compensation throughout the entire term of the contract. If Contractor does not maintain coverage throughout the entire term of the contract, Contractor agrees that Owner may, at any time the coverage is not maintained by Contractor, order the Contractor to stop work, assess liquidated damages as defined herein, suspend the contract, or terminate the contract. For each six month period this contract is in effect, Contractor agrees, prior to the expiration of the six month period, make another written request to SIIS for the provisions of a certificate and notice of lapse in or nonpayment of coverage. If Contractor does not make the request or does not provide the certificate before the expiration of the six month period, Contractor agrees that owner may order the Contractor to stop work, suspend the contract or terminate the contract.

3.17 SPECIAL CONSTRUCTION REQUIREMENTS

Construction of the F4 Debris Basin and Outlet Channel shall be constructed in phases as described herein.

Base Bid shall be defined as limits from F-4 Channel Station 34+06.655 to 23+07.420, and includes the Patrick Lateral, and F-4 Channel Station 54+00.000 to 45+80.000, and entire F-3 Channel along with entire adjacent 5th Cell Channel;

Option No. 1 shall be defined as limits from F-4 Channel Station 45+80.000 to 34+06.655, including all tortoise fencing, topsoil salvaging and plant salvaging in F-4 Debris Basin area and BLM Long Term Disposal Area and BLM

Land adjoining F-4 Channel in Option No. 1 reach, and landscaping work at Flamingo Detention Basin and landscaping work at Blue Diamond Detention Basin, and it is anticipated that Option No. 1 will be awarded within 160 calendar days from date of Notice to Proceed;

Option No. 2 shall be defined as limits from Station 54+00.000 to 70+00.000, including the F4 Debris Basin area and BLM Long Term Disposal Area, and it is anticipated that Option No. 2 will be awarded within 250 calendar days from date of Notice to Proceed.

The Contractor shall restrict his operation and adapt his construction schedule to accommodate the following:

3.17.1 F-4 Debris Basin and Channel and BLM Land Construction Schedule

The Contractor is allowed in the Option No. 1 to install the tortoise fence and salvage the plants and salvage the topsoil on the BLM Lands for the F-4 Debris Basin, for the portions of F-4 Channel, and the BLM Long Term Disposal Site, as shown on the drawings, in accordance with paragraph "Extraction Time of Native Plant Materials." Limits of BLM Lands are shown on the "T" Sheets of the contract plan set. The Contractor shall not begin any other F-4 Basin related construction activities on BLM property prior to the award of Option Item No. 2 for the construction of the F-4 Debris Basin.

The Contractor shall not begin activities on BLM property for the construction of the F-4 Channel beginning with tortoise fencing and plant salvaging operations, until after the later date of either: a) date of award of the Option No. 1 Items, or; b) January 1, 2005. Furthermore, the plant salvage construction activity shall occur within the duration specified in paragraph "Extraction Time of Native Plant Materials."

3.17.1.1 Extraction Time of Native Plant Materials

Native plant materials shall be extracted and salvaged between October 1, 2004 through December 15, 2004 for fall work; and between January 1, 2005 through May 15, 2005 for spring work in accordance with Section 02910 NATIVE PLANT EXTRACTION, SALVAGE AND STORAGE. The Contractor shall make necessary provisions, such that the Government shall not bear any additional costs, in that the fall work period may be shortened by the timeliness of award of the Option Bid Items.

3.17.2 Project Limits

The Contractor's work, employee parking, operations, staging, equipment assembly and maintenance, and other on-site activities shall be restricted to actual areas of construction within the Project Limits. The Project Limits of the F-4 Debris Basin and Channel and Flamingo Detention Basin and Blue Diamond Detention Basin are indicated on the drawings, and constitute the maximum limits of the construction area available for Contractor's operations. The Project limits are generally defined by the Right-of-Way (R/W) and by adjoining Temporary Construction Easements (TCE) as shown on the plans, unless designated otherwise (either in the plans, in these Specifications or by the Contracting Officer).

The Contractor shall be solely responsible for obtaining agreements with and acquisition from adjacent land owners, when additional land or access points are required to supplement the Contractor's operations or staging needs. No appurtenances or other public access facilities (either temporary or permanent) shall be constructed beyond the Project Limits.

Fill TCE also known as Grading Easements (GE) as shown on sheets T8, T11, and T12 shall allow the contractor to utilize the entire areas shown on the plans for the disposal of selected fill, including grading, compaction and soil stabilizing as described herein. No storage of materials shall be permitted within the designated GE, nor shall the Contractor stage or store any equipment.

3.17.3 Existing Roads

Fort Apache Road currently is open to vehicular traffic as paved access from Patrick Lane through Sunset Road, and from Woodscape Parkway to Maule Avenue. Fort Apache Road is currently paved on the east half from Maule Avenue to Boulder Opal Avenue.

Post Road currently is open to vehicular traffic as paved access from Quarter Horse Road through to Grand Canyon Road.

Sunset Road is open to vehicular traffic as paved access from the Beltway through to Iversdale Street.

Maule Avenue is open to vehicular traffic as paved access from Quarterhorse Road to Pearland Avenue.

3.17.3.1 Fort Apache Road, Post Road, Warm Springs Road, Sunset Road, and Maule Avenue

The contractor shall maintain public access along Fort Apache Road, Post Road, Sunset Road, Maule Avenue and Warm Springs Road at all times during this contract. Signs and reflective barriers are to be used as required to allow for safe passage.

We anticipate that Fort Apache Road improvements (by others) from Sunset Road to Martin Avenue, Martin to Maule Avenue and Warm Springs Road to Boulder Opal Avenue are scheduled to be open to vehicular traffic as paved access by development during construction of the F-4 Channel Project. We anticipate Fort Apache Road will be paved (by others) from Warm Springs Road through to Blue Diamond Road during the life of the F-4 Channel contract.

The construction along Fort Apache Road shall be conducted in phases in a manner so as to minimize disruption to merchants, developers, contractors, agencies and the public.

3.17.3.2 ROAD CLOSURES

Maule Avenue east of Fort Apache Road shall be closed to through traffic, (by others), approximately by February 11, 2005, and shall remain closed

upon completion of waterline relocation through the intersection of Maule Avenue. The waterline relocation plans are provided for reference only in the contract plans. The waterline relocation, which will be done by others, will include the construction of a detour road and a pedestrian asphalt sidewalk. The waterline relocation contractor is scheduled to temporarily repave Maule Avenue intersection and is scheduled to reopen Maule Avenue road to traffic no later than May 2005. The detour road and pedestrian asphalt sidewalk provided by the waterline relocation contractor will remain in place through the life of the F-4 Channel contract in coordination and accordance with the requirements of the detour roads and road reconstructions shown on the DT sheets.

The F4 Channel contractor will be allowed to close Maule Avenue east of Fort Apache Road to through traffic after award of Option No. 1 and shall continue to maintain both the detour roads and pedestrian asphalt sidewalk access that was installed by the waterline contract and in accordance with the DT sheets. A Maule Avenue Area Road Traffic and Pedestrian Control Plan and a Maule Avenue Area Road Closure Plan is to be provided and approved by Clark County prior to the Maule Avenue closure and these plans will be updated through the life of the contract. Upon completion of the F-4 Channel through Station 45+80.000, the contractor shall repave and reopen Maule Avenue and restore through traffic following requirements in the DT drawings.

3.17.4 ADJACENT PRIVATE DEVELOPMENT

We anticipate private development to proceed adjacent to and concurrent with F-4 Channel construction at various locations along the channel alignment.

We anticipate construction of commercial development to begin along the eastside of Fort Apache Road during the life of the contract from Station 38+30.174 to Station 40+28.642, Station 42+44.894 to Station 44+46.052, and Station 50+59.828 to Station 52+60.986.

We anticipate construction of residential development to begin during the life of the contract for the F-3 Channel from Station 13+58.29 to Station 13+00.00.

We anticipate that additional development may begin during the life of the contract at other locations along the channel alignment.

Work to be performed under development contracts consists of construction of residential and commercial development shall include and is not limited to related utilities and connector roads.

3.17.5 Runoff F-4 Channel, Debris Basin to Beltway

The work areas for the F-4 debris basin and channel will occur in areas that are subject to flowing waters as a result of rainfall. In addition, the F-4 channel work area is subject to flowing waters as a result of irrigation runoff and other construction related activities (new communities development). The Contractor is advised that it is their responsibility to protect their work from these probable events. In

addition to these and other coordination issues discussed herein, see also specification Section 02100 DIVERSION AND CONTROL OF WATER. See also paragraph National Pollution Discharge Elimination System (NPDES) Permit.

3.17.5.1 Runoff Side Drains

The Contractor shall anticipate storm (and nuisance) runoff coordination from side drains and at side drain locations along the F-4 Channel from Debris Basin to Beltway. Some side drains and laterals are active while others will become active during the life of the F-4 Debris Basin and Channel project. The Contractor shall conduct construction activities with full coordination of these runoff waters and shall safely allow them to pass without inundating other areas of adjacent development. Existing drainage from side drains, and laterals and all future side drain locations shall not be interrupted.

3.17.6 Fort Apache Road, Warm Springs Road, Post Road, Maule Avenue, and Sunset Road Construction Access for Others

The Fort Apache Road, Warm Springs Road, Post Road, and Sunset Road and Maule Avenue crossings are required to have continuous construction access for others across the F-4 Channel alignment.

Emergency vehicular access to the Southern Hills Hospital must be continuous across the F-4 Channel alignment. The contractor shall provide Southern Hills Hospital authorized personnel a minimum of 48 hours notice prior to commencing construction adjacent to the hospital. The Contractor shall be required to construct the Post and Fort Apache Reinforced Concrete Boxes (RCBs) in two phases and ensure that the access is reconfigured during both phases so that traffic activities other than the F-4 Debris Basin and Channel project are not interrupted.

Construction access and business access shall be maintained and shall be continuous for proposed commercial developments between Station 38+30.174 to Station 40+28.642, Station 42+44.894 to Station 44+46.052, and Station 50+59.828 to Station 52+60.986. Driveway access for each commercial development shall be maintained at two locations.

We anticipate that road improvements (by others) at Post Road, Sunset Road Martin Avenue, Maule Avenue and Warm Springs Road, crossing the F-4 Channel, will be under construction during the life of this contract. Any detours utilized by the Contractor shall provide means of passage through the Channel work area that include equivalent road surface requirements (for instance asphalt paving if applicable).

Pedestrian access along the west right-of-way of Fort Apache Road, from Sunset Road through Maule Avenue, and east of Maule Avenue to the Wayne N. Tanaka Elementary School shall be maintained at all times.

3.17.6.1 Fort Apache Road Improvements - Coordination With KB Homes

With the award of the Base Bid and Options, the Contractor shall coordinate his work with KB Homes, Nevada, who will construct Fort Apache Road improvements from Warm Springs Road to south of Windmill Lane. This road

improvement project is scheduled to begin and be completed within the term of the F-4 construction contract. Included in the scope of Fort Apache Road improvement project are two F-4 Channel crossings (RCB's) at Station 64+58.710 to 64+26.407 and at Station 57+36.765 to Station 56+58.445.

KB Homes will construct local storm drain facilities associated with Fort Apache Road improvement project. The Contractor shall connect F-4 Channel laterals as shown on DT sheets to these local storm drain facilities. KB Homes will construct a small detention basin facility located southeast of the F4 Debris Basin, bordered by Windmill Lane to the south and Fort Apache Road to the east. See Sheet DT29 for the KB Homes detention basin plan. The Contractor shall coordinate his work with KB Homes, who is scheduled to start and complete this small detention basin within the term of the F-4 construction contract prior to or in coordination with the award of Option No. 2.

Hauling and construction operations shall be coordinated with various contractors and agencies involved with the improvements to Fort Apache Road.

3.17.6.2 Post Road Improvements - Coordination With Distinctive Homes Development

The Contractor shall coordinate his work with Distinctive Homes, Nevada, who will construct the F3 Channel RCB crossing at Post Road, and half street improvements including curb and gutter, side walk and local storm drain facilities. Distinctive Homes will also construct local storm drain facilities within their residential development that will connect to Station 13+02 of the 5th Cell as shown on Sheet C-19 in the future. Distinctive Homes is scheduled to start and complete this work within the term of the F-4 construction contract.

Hauling and construction operations shall be coordinated with various contractors and agencies involved with the improvements to Post Road.

3.17.7 BLM Lands Materials

All excavated materials from BLM Lands will remain on BLM Lands, however, excavated materials from BLM Lands may be transported as necessary beyond the BLM Land boundary where the excavation occurred into other BLM Land boundaries where the material may be utilized for constructive purposes. The Contractor shall provide information and notice to the Government at least 24 hours prior to transporting BLM materials from one BLM site to another BLM site and the information shall include intended time of action, intended volume of material, and intended use of material.

Excavated materials from non-BLM Lands or from other sites will not be transported, temporarily or permanently, onto BLM Lands except in accordance with Section 02300 EARTHWORK.

The limits of BLM lands (and BLM Materials) are shown on the T Sheets.

3.17.8 Excess Excavated Material

The Contractor shall dispose of excess excavated material, both

satisfactory and unsatisfactory, originating from the construction of the F-4 Channel from non-BLM Lands. Satisfactory excess excavated material shall be disposed of either at the optional designated disposal site (also known as the Russell Road Disposal Site) at no additional cost to the Government, as shown on Sheet T14, or shall become the property of the Contractor for off site disposal at no additional cost to the Government. Unsatisfactory excess excavated material shall become the property of the Contractor and must be properly disposed of off site at no additional cost to the Government. See Section 02300 EARTHWORK for definition of excess excavated material, satisfactory and unsatisfactory.

The Contractor is advised that Post Road, Fort Apache Road, Warm Springs Road, Sunset Road, Patrick Lane, Maule Avenue, and the streets and roads adjacent to the project such as Russell Road, are all currently active and open streets to the Public. Haul routes shall be coordinated through the development of traffic control plans submitted to and approved by Clark County Department of Public Works and through the private developer.

3.17.9 Utility Lines

The Contractor shall protect in place all existing utility lines. These existing utility lines consist of sewer lines, water lines, communication lines, gas lines, and others. The construction work is such that some of these existing utility lines will become uncovered during the course of construction.

3.17.10 Coordination for Utilities

During the life of the F-4 Debris Basin and Channel contract, the Contractor shall anticipate numerous coordination issues with utility owners and with development at various locations along the F-4 Channel and F-3 Channel alignments. New utilities are required to support this rapidly developing area. All existing utility service will be maintained to development throughout the life of this contract. Any temporary disruption in utility service shall require an approved set of plans and written approval from the utility owner and from Clark County Public Works.

Sprint, Nevada Power, Southwest Gas, Las Vegas Valley Water District, Cox Cable and the Clark County Sanitation District are among the utilities anticipated to be improved or added through this area. The Contractor shall coordinate all F-4 Channel and F-3 Channel work with utility companies desiring access to the F-4 Channel and F-3 Channel ROW or TCE limits identified on the contract drawings. The Contractor shall permit any utility or its delegated representative to enter into and use F-4 Channel and F-3 Channel ROW or TCE areas to complete utility work. The F-4 Channel and F-3 Channel ROW and TCE areas are not intended to be restricted for the sole use of the Contractor. The Contractor shall provide the sleeves (steel and PVC) as shown and located on the drawings.

The Contractor shall restrict his operations and adapt his construction schedule to accommodate the following:

3.17.10.1 Water Line Relocation

The Contractor shall coordinate with the contractor performing the waterline relocation improvements.

Clark County Public Works will be administering a construction contract for the relocation of a 42 inch waterline located at the intersection of Fort Apache Road and Maule Avenue. Scope of work includes constructing a detour road from Maule Avenue to Sunset Road along and west of centerline of Fort Apache Road. The detour road shall be constructed and open to the public no later than January 11, 2005. Construction of the waterline relocation is scheduled to begin on February 11, 2005 and to be completed by May 2, 2005. An early Notice To Proceed for F4 Channel "Option No. 1" shall require the Contractor to coordinate with Clark County Public Works and other agencies.

3.17.10.2 Southwest Gas Corporation

Numerous areas of the F4 Channel are parallel to, cross, or interface with gas lines. As indicated by the design, the F4 Channel Contractor shall protect in place, support in place and concrete encase these lines in accordance with the drawing sheets and specifications.

Affected gas lines shall be supported and protected by the Contractor concurrently with the mass excavation through the area where the gas utility is located. The F4 Channel Contractor shall expose and temporarily support/protect in place these gas lines that cross the F4 Channel until the channel structure is completed in the area of crossing. The Contractor shall allow the gas company access to inspect these gas lines during and after mass excavation and fill placement, and shall ensure that proper notification and coordination with the gas company has been made.

Southwest Gas Corporation is scheduled to design and relocate their gas line within Fort Apache Road, from Sunset Road to Maule Avenue, with an anticipated completion date of January 31, 2005.

3.17.10.3 Nevada Power Company

Nevada Power Company is scheduled to relocate utilities that conflict with the F4 Debris Basin and Channel Project in advance of start of construction of the F4 Debris Basin and Channel Project. These utility conflicts are identified by the design as "To be relocated by others."

Numerous areas of the F4 Channel are parallel to, cross, or interface with existing underground and aerial Nevada Power circuits/duct-banks. As identified by the design, the F4 Channel Contractor shall protect in place, support in place and concrete encase these lines in accordance with the drawing sheets and specifications for Nevada Power interfaces. Raising of existing circuits/ductbanks shall include the removal of concrete encasement, new split sleeve conduit, new concrete encasement, and mandrelling for spares and full coordination with Nevada Power. Rigid steel (wrapped) conduit shall be utilized for all bends in new alignments.

Any circuits /duct-banks to be relocated shall be done by Nevada Power Company as described herein. The Government expects that the Contractor shall allow Nevada Power a total of ten (10) working days to relocate any

power lines during and after the mass excavation through these areas in the event Nevada Power Company decides to relocate power lines. The Contractor shall schedule all channel work so that these utility areas may be worked around until the services are relocated by others.

3.17.10.4 Sprint Telephone

Sprint Telephone is scheduled to relocate utilities that conflict with the F4 Debris Basin and Channel Project in advance of start of construction of the F4 Debris Basin and Channel Project. These utility conflicts are identified by the design as "To be relocated by others."

Numerous areas of the F4 Channel are parallel to, cross, or interface with existing underground and aerial Sprint telephone lines. As identified by the design, the F4 Channel Contractor shall protect in place, support in place and concrete encase these lines in accordance with the drawing sheets and specifications for Sprint interfaces. Existing conduits to be raised to facilitate construction of new channel beneath shall be fully coordinated with Sprint. The Contractor should anticipate cutting existing conduit and installing split sleeve conduit of similar diameter and length.

Elongation of existing cables (release of slack) shall be fully coordinated with Sprint to allow installation of longer split sleeve conduit. Spare conduits may be cut and replaced after completion of channel construction. All existing conduits for telephone lines which are temporarily disturbed by Contractor shall be reconnected, mandrelled, and installed with pull ropes. Rigid steel (wrapped) conduits shall be utilized for all bends.

Any telephone lines to be relocated shall be done by Sprint as described herein. The Government expects that the Contractor shall allow Sprint a total of ten (10) working days to relocate any telephone lines during and after the mass excavation through these areas in the event Sprint decides to relocate telephone lines. The Contractor shall schedule all channel work so that these utility areas may be worked around until the services are relocated by others.

3.17.10.5 Cox Cable

Cox Cable Company is scheduled to relocate utilities that conflict with the F4 Debris Basin and Channel Project in advance of start of construction of the F4 Debris Basin and Channel Project. These utility conflicts are identified by the design as "To be relocated by others."

Numerous areas of the F4 Channel are parallel to, cross, or interface with existing Cox duct-banks. As identified by the design, the Contractor shall protect in place, support in place and concrete encase these lines in accordance with the drawing sheets and specifications for Cox Cable Company interfaces. Existing conduits to be raised to facilitate construction of new channel beneath shall be fully coordinated with Cox. The Contractor should anticipate cutting existing conduit and installing split sleeve conduit of similar diameter and length. Elongation of existing cables (release of slack) shall be fully coordinated with Cox to allow installation of longer split sleeve conduit. Spare conduits may be cut and replaced after completion of channel construction. All existing conduits

for cable TV lines which are temporarily disturbed by Contractor shall be reconnected, mandrelled, and installed with pull ropes. Rigid steel (wrapped) conduits shall be utilized for all bends.

Any duct-banks to be relocated shall be done by Cox Cable Company as described herein. The Government expects that the Contractor shall allow Cox Cable Company a total of ten (10) working days to relocate any cable lines during and after the mass excavation through these areas in the event Cox decides to relocate cable lines. The Contractor shall schedule all channel work so that these utility areas may be worked around until the services are relocated by others.

3.17.10.6 Sanitary Sewer

The Contractor shall expose and temporarily support/protect in place sewer lines and manholes that cross the F4 Channel until the channel structure is completed in the area of crossing. The Contractor shall allow the Water Reclamation District access to inspect these sewer lines during and after the mass excavation and fill through these areas is completed, and shall ensure that proper notification coordination with the Water Reclamation District has been made.

3.17.11 RCB Construction for F-4 Channel Post Road crossing and for F-3 Channel and 5th Cell Fort Apache Road crossing

During the construction of the RCB for the F-4 Channel Post Road crossing and the RCBs for the F-3 Channel and 5th Cell Fort Apache crossing (each F-4 and F-3/5th Cell RCB structure required to be built in two phases as identified elsewhere in this specification section), the Contractor shall maintain detour roads as shown on DT Sheets.

Channel excavation activities shall therefore be coordinated by the Contractor so that detour roads can be installed, maintained and flip flopped (for the second phase) without the detour roads encroaching into the open channel excavation.

3.17.12 Temporary Construction Easement Expirations

The Temporary Construction Easements (TCEs) for the project expire on 30 June 2006. The Contractor shall no longer have the use of the TCE's after 23 June 2006. The TCE areas shall be completed to the required final design configuration and vacated effective as of 23 June 2006.

3.17.13 Processing of Excess Excavated Material

The Contractor shall not be permitted to process excess excavated material within the project site for any use other than that identified in this contract. Processing excess excavated material for sale, or other off site disposal shall not be allowed within the real estate limits identified by this project.

3.17.14 DISPOSAL OF EXCESS EXCAVATED MATERIALS

A. For non-BLM Property: Satisfactory excavated materials not utilized as

part of the construction shall be considered as satisfactory excess excavated materials and shall be disposed of at the Optional Designated Disposal Site (also known as the Russell Road Disposal Site) shown on drawing sheet C43 and in accordance to requirements in these specifications and on drawing sheet C43 at no additional cost to the Government and/or shall become the property of the Contractor and shall be removed from the project site at no additional cost to the Government. Contractor shall note that volume and area shown in drawing sheet C43 is in English units and shall make adjustments to metric accordingly.

B. For BLM Property : Material originating from BLM property will not be allowed to leave BLM property boundaries, with exception of existing construction and manmade debris and trash. BLM material, including satisfactory excavation material, and including topsoil, will be utilized for the various fills required on the BLM property. All excess satisfactory BLM excavation material will be disposed of in the BLM Long Term Disposal Site on BLM property shown on drawing sheet C44 and in accordance to requirements in these specifications and on drawing sheet C44. The limits of BLM Lands and BLM Materials are shown on the T sheets.

Materials characterized as unsatisfactory soil in accordance with Section 02300 EARTHWORK and materials designated as scrap shall become the property of the Contractor and shall be removed from the project site and disposed of according to paragraph UNSATISFACTORY AND SCRAP MATERIAL of this section at no additional cost to the Government. If the Contractor elects to temporarily stockpile material within the ROW and TCE, no additional money shall be provided to re-load and haul this material away from the project site. The Contractor shall indicate the approximate quantities of material he proposes to remove from the site, or to place in the disposal sites. In addition to the above requirements, the Contractor shall notify the Contracting Officer 24 hours in advance of the time he proposes to start operations in which material is removed from the project site, and 48 hours in advance of any material removal from the project site which he proposes to do on Saturday, Sunday or legal holidays.

3.17.15 NO DUST PALLIATIVE/SOIL STABILIZER MIXED IN WITH F-4 DEBRIS BASIN EMBANKMENT COMPACTED FILL MATERIALS OR IN CHANNEL AND ROAD COMPACTED BACKFILL MATERIALS

The Contractor shall not utilize any materials that have mixed into it Dust Palliative and/or Soil Stabilizer. Use of material containing Dust Palliative and/or Soil Stabilizer for compacted fills will be cause for immediate rejection and Contractor shall re-do affected work at no additional cost to the Government. The Contractor shall not utilize the Dust Palliative and/or Soil Stabilizer as a temporary dust control method unless directed in writing to do so by the Contracting Officer.

3.18 CONTRACTOR'S SURVEYS

3.18.1 Survey Data

Reference is made to SECTION 00800: SPECIAL CONTRACT REQUIREMENTS, QUANTITY SURVEYS, ALTERNATE I, FAR 52.236-16 which requires payments based on surveys. Progress payments will be based upon Contractor's surveys. The

Contractor's survey shall provide full coverage of the entire area for which progress payment is being submitted.

It is further emphasized that survey data which does not meet all applicable requirements and quality assurance verifications will not constitute a valid request for payment.

Contractor's surveys shall be performed electronically (automated) and the data shall be provided and submitted to the Government on an electronic media (IBM compatible, ASCII format) in delimited files of easting, northing, and depth (x,y,z), where the depth is indicated as positive if recorded above mean sea level. The first lines of the data file will list the information as follows:

(NOTE THAT THE PROJECT NAME IS AN EXAMPLE)

- * Project Name: F-4 BASIN AND CHANNEL; Entire Project Except Disposal Site, FY2004/FY2005
- * Surveyor's Name and Company Name
- * Area Surveyed
- * Type of Survey and Date of Survey (i.e. Pre-construction, MM/DD/YR)
- * Vertical Datum
- * Horizontal Datum

These first 6 lines will be preceded by an asterisk (*), which indicates a comment line.

For both the pre-construction and post construction surveys, three (3) copies of the survey plotted on paper will accompany the x,y,z data (electronic file) and all data shall be collected and plotted in metric units (meters).

3.18.2 Survey Data Standards

The Contractor's surveys for progress payment shall meet or exceed the survey standards listed in COE EM 1110-1-1005, Topographic Surveying for topographic surveys. Surveys shall be in the State Plane Coordinate System of 1983 - meters (SPCS 83), State of Nevada, and be performed by an independent survey contractor with at least three (3) years of experience in topographic surveying of land features and have either a current Land Surveyor's or a Professional Engineer's license, authorized to certify surveys in the State of Nevada. The Topographic Surveyor firm selected by the Contractor must be approved by the Contracting Officer prior to performing surveys for this contract.

3.18.3 Positioning System

It is required that surveys shall be conducted using an RTK or similar modern electronic surveying equipment using Differential Global Positioning System (DGPS) with positional accuracy equal to or exceeding the survey standards listed in COE EM 1110-1-1003 and COE EM 1110-1-1005.

3.18.4 Survey Firm Acceptance

For the Contracting Officer to approve the selected survey firm, the Contractor must provide documentation indicating that modern electronic surveying equipment will be used for the surveys to be performed as well as documentation verifying the experience of the operators using the equipment. Typical information that will be required, as a minimum, includes the name, model, and year of manufacture of the electronic equipment, and the manufacturer's stated accuracies, and capability of the equipment proposed for usage. The Contractor shall submit credentials/qualifications as evidence that qualified, experienced staff are available and will be used for the operation of the electronic positioning and surveying equipment.

3.18.5 Data Processing

The Contractor shall use a Data Processing System to map the survey data and calculate quantities. Reduced survey data shall then be imported into the Data Processing System where cross-sections are compared to fill templates and volume quantities are calculated. The software shall be capable of digital terrain modeling and shall produce, as a minimum, topographic survey sheets, cross section profiles, 3-dimensional area profiles, and quantity volume calculations using the Triangulated Irregular Network (TIN) method.

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- 1.50 OUTLET CONDUIT SIDE DRAIN STRUCTURE, STA. 64+95.108 RT (Bid Item 2028).
- 1.51 SIDE DRAINS (Bid Items 0033, 0034, 0035, 0036, 0037, 0038, 0039, 0040, 1010, 1011, 1012, 1021, 1022, 1023, 2028, 2029, 2030, 2031, 2060, 2061, 2062, 2063)..
- 1.52 SLOTTED CHAMBER (Bid Item 2032)
- 1.53 MANHOLES FOR RCB CONDUITS, CULVERTS, AND LATERALS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0047); MANHOLES FOR RCB CONDUITS, CULVERTS, AND LATERALS OPTION NO. 1 (Bid Item 1013); MANHOLES FOR RCB CONDUITS, CULVERTS, AND LATERALS OPTION NO. 2 (Bid Item 2033).33).
- 1.54 ROAD DETOURS EXCEPT FOR OPTION NO. 1 (Bid Item 0084); ROAD DETOURS OPTION NO. 1 (Bid Item 1020)..
- 1.55 CHAIN LINK FENCE, 1.829 M HIGH, 9 GAGE EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0048); CHAIN LINK FENCE, 1.829 M HIGH, 9 GAGE OPTION NO. 2. (Bid Item 2034)..
- 1.55.1 Measurement.
- 1.55.2 Payment.
- 1.56 POST AND CABLE RAILING EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0049); POST AND CABLE RAILING OPTION NO. 2 (Bid Item 2035)..
- 1.56.1 Measurement
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- 1.57 DOUBLE SWING GATES EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0050); DOUBLE SWING GATES OPTION NO. 2 (Bid Item 2036)..
- 1.57.1 Measurement
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- 1.58 [Enter Appropriate Subpart Title Here]

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- 1.58.1 Measurement
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- 1.59 STATION MARKINGS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0052); STATION MARKINGS OPTION NO. 1 (Bid Item 1018); STATION MARKINGS OPTION NO. 2 (Bid Item 2038)..
- 1.60 AS-BUILT DRAWINGS ENTIRE PROJECT (Bid Item 0053).
- 1.60.1 Measurement
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- 1.61 LADDER SYSTEMS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0046); LADDER SYSTEMS OPTION NO. 1 (Bid Item 1015); LADDER SYSTEMS OPTION NO. 2 (Bid Item 2039)..
- 1.62 DELETED
- 1.63 PROVIDE PLANT STORAGE IRRIGATION DURING CONSTRUCTION (Bid Item 1027)
- 1.64 PROVIDE IRRIGATION FOR ONE YEAR AFTER CONSTRUCTION AT F-4 DEBRIS BASIN (Bid Item 2041)
- 1.65 ONE YEAR GUARANTEE ON LANDSCAPE WORK AT BLUE DIAMOND BASIN (Bid Item 1054); ONE YEAR GUARANTEE ON LANDSCAPE WORK AT FLAMINGO BASIN (Bid Item 1055); ONE YEAR GUARANTEE ON LANDSCAPE WORK AT F-4 DEBRIS BASIN (Bid Item 2042)42)

- 1.66 TORTOISE FENCE, OPTION NO. 1 F-4 CHANNEL (Bid Item 1024); TORTOISE FENCE, F-4 DEBRIS BASIN (Bid Item 1025))
 - 1.66.1 Measurement
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- 1.67 SALVAGE, STORE, AND MAINTAIN PLANTS (Bid Items 1028 - 1032)
 - 1.67.1 Measurement
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- 1.68 TRANSPLANT TO F-4 BASIN (Bid Items 2043 - 2047)
 - 1.68.1 Measurement
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- 1.69 PLACE TOPSOIL TO FINISH GRADE, F-4 DEBRIS BASIN DOWNSTREAM EMBANKMENT SURFACE (Bid Item 2048)
 - 1.69.1 Measurement
 - 1.69.2 Payment
- 1.70 PROVIDE BROWSE PROTECTION, F-4 DEBRIS BASIN (Bid Item 2050)
- 1.71 SIMULATED DESERT VARNISH ROCK COLOR MITIGATION (Bid Item 2051)
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- 1.72 SOIL SAMPLING AND TESTING FOR FERTILITY, F-4 DEBRIS BASIN (Bid Item 2052))
 - 1.72.1 Measurement
 - 1.72.2 Payment
- 1.73 PIGMENTED DUST PALLIATIVE/SOIL STABILIZER ONLY ON REVEGETATED AREAS (Bid Item 2053)
 - 1.73.1 Measurement
 - 1.73.2 Payment
- 1.74 PROVIDE CHANNEL EXCAVATION SHORING (Bid Item 1006)
- 1.75 CLEAR SITE AND REMOVE OBSTRUCTIONS AT BLUE DIAMOND AND FLAMINGO DETENTION BASINS (Bid Item 1034).
- 1.76 ADJUST SEWER MANHOLE FRAMES AND COVERS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0044); ADJUST SEWER MANHOLE FRAMES AND COVERS OPTION NO. 1 (Bid Item 1017)..
- 1.77 BLUE DIAMOND PROVIDE AND PLANT (Bid Items 1035-1042); FLAMINGO BASIN PROVIDE AND PLANT (Bid Items 1045-1051)
 - 1.77.1 Measurement
 - 1.77.2 Payment
- 1.78 BLUE DIAMOND PROVIDE SEEDING AND FERTILIZATION (Bid Item 1043); FLAMINGO BASIN PROVIDE SEEDING AND FERTILIZATION (Bid Item 1052); SEEDING AND FERTILIZATION, F-4 DEBRIS BASIN EMBANKMENT DOWNSTREAM SURFACE (Bid Item 2049)9)
 - 1.78.1 Measurement
 - 1.78.2 Payment
- 1.79 BLUE DIAMOND PROVIDE 1 YEAR IRRIGATION AND MAINTENANCE (Bid Item 1044); FLAMINGO BASIN PROVIDE 1 YEAR IRRIGATION AND MAINTENANCE (Bid Item 1053)3)
- 1.80 UTILITY CROSSING ITEMS EXCEPT OPTION NO. 1 AND OPTION NO. 2 (Bid Item 0043); UTILITY CROSSING ITEMS OPTION NO. 1 (Bid Item 1019); UTILITY CROSSING ITEMS OPTION NO. 2 (Bid Item 2054)).
- 1.81 BLUE DIAMOND DETENTION BASIN LANDSCAPE FILL (Bid Item 1056); FLAMINGO DETENTION BASIN LANDSCAPE FILL (Bid Item 1057))
 - 1.81.1 Measurement
 - 1.81.2 Payment
- 1.82 CLEAR SITE AND REMOVE OBSTRUCTIONS, POST AND FORT APACHE (Bid Item 0040).

- 1.83 SINGLE SWING GATE (Bid Item 0045).
 - 1.83.1 Measurement
 - 1.83.2 Payment.
- 1.84 BASIN DEPTH GAGES (Bid Items 2064)
- 1.85 BASIN STILLING WELL (Bid Items 2065)
- 1.86 STORM WATER POLLUTION PREVENTION FACILITIES, EXCEPT OPTION NO. 1 AND OPTION NO. 2 (Bid Item 0055); STORM WATER POLLUTION PREVENTION FACILITIES, OPTION NO. 1 (Bid Item 1016); STORM WATER POLLUTION PREVENTION FACILITIES, OPTION NO. 2 (Bid Item 2055).).
- 1.87 ROAD DETOURS AND ROAD RECONSTRUCTION EXCEPT OPTION NO. 1 (Bid Item 1059); ROAD DETOURS AND ROAD RECONSTRUCTION OPTION NO. 1 (Bid Item 0042)..

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

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SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

BLM Land area locations and boundaries are shown on the T sheets.

1.1 REFERENCES (NOT USED)

1.2 CONTRACT PRICE AND PAYMENT

The contract price and payment shall constitute full compensation as stated in the Contract Clause, CONTRACT PRICES - BIDDING SCHEDULES, for completion of the work. No separate payment will be made for any material or work necessary to complete the work that is not specifically mentioned, such materials and work shall be considered incidental to all bid items. As stated in Contract Clause, SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, the word "provided" shall be understood to mean "furnished and installed" when used in this section or elsewhere in the technical sections.

1.3 BASE BID LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided. **Base bid items includes channel construction work and all appurtenances as shown on the drawings.** Base bid items does not include work per contract line items in the Option No. 1 and Option No. 2 features.

1.4 BASE BID UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items. **Base bid items includes channel construction work and all appurtenances as shown on the drawings.** Base bid items does not include work per contract line items in the Option No. 1 and Option No. 2 features.

1.5 OPTION No. 1 AND OPTION No. 2 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided. Option No. 1 includes channel construction work and all appurtenances between Station 45+80.000 to Station 34+06.655, **and also includes including installation of tortoise fencing, plant salvaging and top soil salvaging on BLM Lands including at the F-4 Basin and also includes Blue Diamond basin and Flamingo basin re-vegetation work**, that may or may not be executed depending on acquisition of right-of-way grants and funding; Option No. 2 includes channel construction work and debris basin embankment work and re-vegetation work and all appurtenances between Station 70+00.000 to Station 54+00.000 that may or may not be executed depending on acquisition of right-of-way grants and funding.

1.6 OPTION No. 1 AND OPTION No. 2 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items. Option No. 1 includes channel construction work and all appurtenances between Station 45+80.000 to Station 34+06.655, **and also includes including installation of tortoise fencing, plant salvaging and top soil salvaging on BLM Lands including at the F-4 Basin and also includes Blue Diamond basin and Flamingo basin re-vegetation work**, that may or may not be executed depending on acquisition of right-of-way grants and funding; Option No. 2 includes channel construction work and debris basin embankment work and re-vegetation work and all appurtenances between Station 70+00.000 to Station 54+00.000 that may or may not be executed depending on acquisition of right-of-way grants and funding.

1.7 TRAFFIC CONTROL, EXCEPT FOR OPTION NO. 1 AND OPTION NO. 2 (Bid Item 0001);

TRAFFIC CONTROL, OPTION NO. 1 (Bid Item 1001);

TRAFFIC CONTROL, OPTION NO. 2 (Bid Item 2001)).

Payment for Traffic Control will be made at the applicable contract price, which payment shall constitute full compensation for traffic control including but not limited to earthwork and grading, construction and removal of temporary roadways; providing safety barriers; providing traffic warning and control signs and lighting; stripping; flag men as required, except where covered under other bid items.

1.8 DIVERSION AND CONTROL OF WATER EXCEPT OPTION NO. 1 AND OPTION NO. 2
(Bid Item 0002);
DIVERSION AND CONTROL OF WATER OPTION NO. 1 (Bid Item 1002);
DIVERSION AND CONTROL OF WATER OPTION NO. 2 (Bid Item 2002).).

Payment for Diversion and Control of Water will be made at the applicable contract price, which payment shall constitute full compensation for maintaining the work area in a dry condition.

1.9 [Enter Appropriate Subpart Title Here] **1.9 CLEAR SITE AND REMOVE OBSTRUCTIONS, EXCEPT FOR BID ITEM 0054 AND OPTION NO. 1 AND OPTION No. 2 (Bid Item 0003);**
CLEAR SITE AND REMOVE OBSTRUCTIONS OPTION NO. 1 (Bid Item 1003);
CLEAR SITE AND REMOVE OBSTRUCTIONS OPTION NO. 2 (Bid Item 2003);
CLEAR SITE AND REMOVE OBSTRUCTIONS OPTION NO. 2 DRAWING SHEET DT29 (Bid Item 2056).

Payment for Clear Site and Remove Obstructions shall include all costs for clearing, removal, disposal, replacement, and restoration work (except work by others) including all existing obstructions within the construction work area, except for clearing, removal, disposal, replacement and restoration work specifically specified in other bid items throughout this project. Except as otherwise specified, or except as otherwise indicated in other bid items, payment for clearing and removal work includes applicable earthwork; filling holes; removal of abandoned utility lines; removal of existing surface trash and debris, including trees and vegetation and debris piles (consisting of construction debris and/or dumped soils, dumped gravels, dumped rocks and dumped boulders), including vehicle debris (vehicle bodies and/or vehicle parts) and appliance debris (whole and/or parts), and grubbing from within the Channel right-of-way and temporary construction easement; including removal of existing riprap rock as shown on the drawings, **removal of any existing filter fabric and or geotextile fabric under riprap**, removal of existing cutoff walls, headwalls, and wingwalls **and removal of existing chainlink fence**, as shown on the drawings, including DT sheets; removal of existing concrete pavement and concrete curb and gutter and plant mix bituminous surface (pbs) as shown on the drawings; **including removal and disposal of existing plant mix bituminous surface (PBS) walkways and subgrade material installed by Clark County School District not shown on the drawings but within the Right Of Way and TCE**, however after installation of temporary PBS walkway and subgrade material in area designated on DT drawing sheets; including removal and disposal of existing storm drain bubbler and related storm drain piping located at the north west corner of the intersection of Maule and Fort Apache Road; including surface scraping and surface clearing of the existing developer housing pad fill slopes and existing wash surfaces of trash and large and small boulders and caliche from Station 64+60.000 to Station 58+60.000 within the Right Of Way line, however stones, boulders and chunks of caliche embedded within the slopes shall be left in place unless disturbed or knocked loose from the existing fill slopes; including removal and disposal of existing caliche chunks approximately between **Station 62+50.000 to Station 60+50.000**; including sawcutting and removal of necessary portion of the existing precast and/or cast in place concrete drainage structures to allow for placement of new channel and side drain structure; removal, protection, replacement or restoration of existing

structures and features indicated and disposal of all materials. Payment for Clear Site and Remove Obstructions, will be made at the applicable contract price, which payment shall constitute full compensation for clearing, obstruction removal, and protection work, complete.

1.9.1 CLEAR SITE AND REMOVE OBSTRUCTIONS, BID ITEM 0054 ONLY (Bid Item 0054)

Payment for Clear Site and Remove Obstructions, bid item 0054 only, shall include all costs for clearing, removal, disposal, replacement, and restoration work (except work by others) including all existing obstructions within the construction work area of F-4 Channel from Station 32+80.000 to Station 29+59.000 and of F-3 Channel from Station 13+75.000 to Station 10+00.000, including the 5th Cell channel structure, except for clearing, removal, disposal, replacement and restoration work specifically specified in other bid items throughout this project. Except as otherwise specified, or except as otherwise indicated in other bid items, payment for clearing and removal work includes applicable earthwork; filling holes; removal of abandoned utility lines; removal of existing surface trash and debris, including trees and vegetation and debris piles (consisting of construction debris and/or dumped soils, dumped gravels, dumped rocks and dumped boulders), including vehicle debris (vehicle bodies and/or vehicle parts) and appliance debris (whole and/or parts), and grubbing from within the Channel right-of-way and temporary construction easement; including removal of existing riprap rock as shown on the drawings, removal of existing filter fabric and or geotextile fabric under riprap, removal of existing cutoff walls, headwalls, and wingwalls as shown on the drawings, including DT sheets; including removal and disposal of existing culvert shown on sheet DT1 and removal and disposal of existing riprap upstream and downstream of this culvert; including removal and disposal of existing large chunks of caliche material and chunks of concrete at the north side of the Post Road embankment east of Fort Apache Road within the Right Of Way, TCE and Grading Easements; including removal and disposal of existing manhole at location north of intersection of Fort Apache Road and Post Road and removal and disposal of existing surrounding concrete barrier rail and removal and disposal of existing 48" RCP within ROW/TCE; including removal and disposal of existing drop inlet structure (either type DM or type CM) and removal and disposal of related existing 48" RCP within ROW and TCE and removal and disposal of related existing PVC pipe within ROW/TCE all of which are located immediately north east of intersection of Fort Apache Road and Post Road; including removal and disposal of existing riprap located at the north east corner of the Fort Apache Road and Post Road alignment intersection; including removal and disposal of existing riprap located in F-3 Channel alignment downstream of Post Road RCB; including removal and disposal of riprap along Post Road embankment north face both east and west of Fort Apache Road; removal of existing concrete pavement and concrete curb and gutter and plant mix bituminous surface (pbs) as shown on the drawings, including sawcutting and removal of necessary portion of the existing precast and/or cast in place concrete drainage structures to allow for placement of new channel and side drain structure; removal, protection, replacement or restoration of existing structures and features indicated and disposal of all materials. Payment for Clear Site and Remove Obstructions, will be made at the applicable contract price, which payment shall constitute full compensation for clearing, obstruction removal, and protection work, complete.

1.10 STRIP AND STOCKPILE TOPSOIL, F-4 DEBRIS BASIN RIGHT OF WAY, F-4 CHANNEL RIGHT OF WAY, BLM LAND (Bid Item 1033).**1.10.1 Measurement**

A survey of the site shall be made by the Contractor prior to commencement of work, and all measurements will be based on this survey without regard to any changes in the site that may be made between the excavation lines and grades indicated on the drawings or staked in the field and the ground surfaces as indicated by the above mentioned survey. Measurement shall be based on the difference between surveyed original grade and the grade and slope of the theoretical cross sections indicated on the drawings. The actual slopes as excavated may be greater or less than those indicated or staked, depending on the materials excavated and methods used in performing the work, but such alterations shall not change the measurement for payment from the original lines as specified herein. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measurement of plotted cross sections. The Contractor has the option of using computer methods for quantity estimations, but all computer methods of quantity estimations shall be approved by the Contracting Officer. **The areas on BLM lands that are adequate for topsoil salvaging are those areas of the F-4 Debris Basin Right of Way and F-4 Channel Right of Way on BLM land.** For BLM owned land, stripping topsoil outside of project Right of Way lines shown on the drawings will not be allowed. **Topsoil obtained from non-BLM land shall be considered as being for the convenience of the Contractor, however such topsoil must meet specifications, if utilized.**

1.10.2 Payment

Payment for strip and stockpile topsoil will be made at the applicable contract price per cubic meter for the basin site, which payment shall constitute full compensation for stripping and stockpiling specified surface soils, including clearing of grasses and weeds, debris and roots, after plant salvaging operations, as indicated in the specifications.

1.11 EXCAVATION

1.11.1 [Enter Appropriate Subpart Title Here]**1.11.1 EXCAVATION CHANNEL, BLM LANDS AND/OR MATERIALS, EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0004);**
EXCAVATION CHANNEL, NON-BLM LAND, EXCEPT OPTION NO. 1 AND OPTION NO. 2 (Bid Item 0005);
EXCAVATION CHANNEL, NON-BLM LAND, OPTION NO. 1 (Bid Item 1004);
EXCAVATION CHANNEL, NON-BLM LAND, OPTION NO. 2 (Bid Item 2004);
EXCAVATION CHANNEL, BLM LANDS, OPTION NO. 1 (Bid Item 1005);
EXCAVATION CHANNEL, BLM LANDS, OPTION NO. 2 (Bid Item 2005);
EXCAVATION F-4 DEBRIS BASIN, BLM LAND (Bid Item 2006).

1.11.1.1 Measurement

A survey of the site shall be made by the Contractor prior to commencement of work, and all measurements will be based on this survey without regard

to any changes in the site that may be made between the excavation lines and grades indicated on the drawings or staked in the field and the ground surfaces as indicated by the above mentioned survey. Measurement shall be based on the difference between surveyed original grade and the grade and slope of the theoretical cross sections indicated on the drawings. The actual slopes as excavated may be greater or less than those indicated or staked, depending on the materials excavated and methods used in performing the work, but such alterations shall not change the measurement for payment from the original lines as specified herein. The quantity of directed excavation necessary for the removal of unsatisfactory foundation material as specified shall be included in the measurement of the excavation where the unsatisfactory soils are encountered. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measurement of plotted cross sections. The Contractor has the option of using computer methods for quantity estimations, but all computer methods of quantity estimations shall be approved by the Contracting Officer. **All excavation outside of excavation lines shown on the drawings will be considered as being for convenience of the Contractor.**

1.11.1.2 Payment

Payment for excavation will be made at the applicable contract price, which payment shall constitute full compensation for excavation for the inlet structure embankment and spillway/transition structure foundations, inspection trenches, inlet structure invert, channels, roads and other areas as indicated on the drawings including shoring, blasting, rock excavation, and cemented alluvium excavation; shaping and trimming of areas to receive concrete or embankment material, soil cement, loading, stockpiling, crushing, processing, hauling, and dumping suitable materials for fills for the inlet structure embankments, channels, inlet structure spillway/ transition, and backfill for structures and pipes; and loading, stockpiling, hauling, placing and grading excavated materials in the graded basin areas. Payment will not be included for excavation (including shoring) outside the excavation limits indicated on the drawings or staked in the field, and other earthwork requirements for which separate payments are provided. **Excess BLM material that cannot be placed as miscellaneous fill on the downstream areas of the F-4 Debris Basin Embankment in accordance with the drawings shall be placed and graded in the BLM Long Term Disposal site as shown on sheet C44.**

1.11.1.3 Excavation, F-4 Debris Basin

Payment for excavation, F-4 Debris Basin, will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for excavation as indicated on the drawings including foundation preparation for any overexcavation for the F-4 Debris Basin embankment. Payment for excavation, F-4 Debris Basin, shall not include the quantity included in clearing and grubbing and in strip and stockpile topsoil and other earthwork requirements for which separate payments are provided. **The handling of BLM Land materials shall be in accordance with specification.**

1.11.1.4 Excavation, Channel

Payment for excavation, channel will include excavations for spillway/transition and spillway/transition cutoff walls, and will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for excavation and haul and disposal of excess material. **The handling of BLM Land materials shall be in accordance with specification.**

1.11.1.5 Subgrade or Foundation Preparation

No separate payment will be made for subgrade or foundation preparation, including required shaping and cleaning of bedrock abutments and placement of mortar or concrete as necessary, and all costs in connection therewith shall be included in the contract prices for excavation or the items to which the work applies.

1.11.1.6 Unsatisfactory Soils

Unless specified in a separate bid item, no separate payment will be made for the excavation, hauling, and disposal of unsatisfactory soils. When such excavation is directed, payment therefore will be included in the applicable contract price for the items of work under which the unsuitable soils are encountered. When there is no applicable contract item an adjustment will be made.

1.11.1.7 Excavation for Structures

No separate payment will be made for excavation for structures such as manholes, outlet structures, stilling wells, and headwalls. All costs therefore shall be included in the applicable contract item to which the work applies.

1.11.1.8 Trenches

No separate payment will be made for the excavation and disposal of pipe trenches. All costs therefore shall be included in the applicable contract prices for the items to which the work applies.

1.11.1.9 Shoring

Except where otherwise directed within the specific shoring bid item, no other separate payment will be made for shoring. The Contractor shall be responsible for the method of construction and the use of shoring, stable slope cuts, or other trench safety requirements.

1.11.1.10 Excavation for Utilities

No separate payment will be made for excavation for utilities. All costs therefore shall be included in the applicable contract item to which the work applies.

1.11.2 FLAMINGO DETENTION BASIN REMOVE AND DISPOSE OF DEBRIS LADEN SOILS AS SCRAP (Bid Item 0006)

1.11.2.1 Measurement

A survey of the site shall be made prior to commencement of work, and intermediate surveys shall be made during the work, and a final measurement will be made upon accomplishing either the complete excavation of the debris laden soils or the volume quantity of this feature, and all measurements will be based on these surveys without regard to any changes in the site that may be made between the debris laden soil lines and grades staked or surveyed in the field and the ground surfaces and grades as indicated by the topography on the drawings. Measurement shall be based on the difference between surveyed and or staked debris laden soil and the original grade that is defined as non-debris laden soil. Measurement of the remove and dispose of debris laden soils as scrap will be by the cubic meter for the volume removed from the site as shown on the drawings and described herein. Contractor shall not exceed the debris laden soil quantity indicated on the Bid Item Sheets, Section 00010 or Document 00010 unless with approval from the Contracting Officer. Should the Contractor choose to exceed the debris laden soil quantity indicated, it will be at no additional cost to the Government.

1.11.2.2 Payment

Payment for Flamingo Detention Basin remove and dispose of debris laden soils as scrap will be made at the applicable contract price per cubic meter, which payment shall constitute full compensation for removal, loading, hauling, dump fees, and disposal off-site as scrap of all surface dumping including, but not limited to, dumped soils, dumped scalped soils (fines removed), dumped plastic items, dumped tires, dumped caliche (cemented materials), dumped large stones (**approximately 1.5 meters (5 feet) in size**), dumped wood items, dumped reinforced concrete pipe, dumped large pieces of broken reinforced concrete and unreinforced concrete, dumped masonry block (broken and assembled multiple units), dumped debris piles, dumped trash, dumped furniture, dumped car and car parts, dumped metal parts, dumped organics (tree, grass and other trimmings and organics) and other dumped typical construction debris, as necessary for the Contractor's operations within the limits of the designated Right-Of-Way and temporary construction easement (TCE). This work shall not include any excavation of the Flamingo Detention Basin Embankment but only the soil that is debris laden in locations as indicated in the drawings, nor shall this work include the removal of the existing riprap protection on the Flamingo Detention Basin Embankment. **Contractor shall, at no additional cost to the Government, repair any construction related disturbances to the Flamingo Detention Basin Embankment and riprap protection, in accordance with Contractor submitted and approved procedures.** This work shall also include the protection in place, or restoration, of existing facilities that are to remain in place. Contractor shall not exceed the debris laden soil quantity indicated on the Bid Item Sheets, Section 00010 or Document 00010 unless with approval from the Contracting Officer.

1.12 FILLS

1.12.1 Measurement.

Measurement for fills will be made between the excavation and structure lines and the fill limit lines, or between the ground lines and fill lines, as indicated or staked in the field. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections. The Contractor has the option of using computer methods of quantity estimation, but all computer methods of quantity estimation shall be approved by the Contracting Officer.

1.12.2 Payment.

1.12.2.1 COMPACTED FILL, CHANNEL, NON-BLM LAND, EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0007).

Payment for Compacted Fill, Channel, non-BLM Land, except for option no. 1 and option no. 2, will be made at the applicable contract price, which payment shall constitute full compensation for shaping, grading, filling behind the channel walls including access ramps, over covered channels, and other areas shown on the drawings, and compacting the fill, complete.

Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.

1.12.2.2 COMPACTED FILL, CHANNEL, NON-BLM LAND, OPTION NO. 1 (Bid Item 1007)..

Payment for Compacted Fill, Channel, non-BLM Land, option no. 1, will be made at the applicable contract price, which payment shall constitute full compensation for shaping, grading, filling behind the channel walls including access ramps, over covered channels, and other areas shown on the drawings, and compacting the fill, complete. **Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.**

1.12.2.3 COMPACTED FILL, CHANNEL, BLM LANDS OPTION NO. 1 (Bid Item 1008)..

Payment for Compacted Fill, Channel, BLM Lands option no. 1 will be made at the applicable contract price, which payment shall constitute full compensation for shaping, grading, filling behind the channel walls including access ramps, over covered channels, and other areas shown on the drawings, and compacting the fill, complete, including processing of certification form for material import onto BLM Lands as necessary.

Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.

1.12.2.4 COMPACTED FILL, CHANNEL, BLM LAND, OPTION NO. 2 (Bid Item 2007).

Payment for Compacted Fill, Channel, BLM Lands south of Sta. 64+22.874 will be made at the applicable contract price, which payment shall constitute full compensation for shaping, grading, filling behind the channel walls including access ramps, over covered channels, and other areas shown on the

drawings, and compacting the fill, complete, including processing of certification form for material import onto BLM Lands as necessary.

Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.

1.12.2.5 COMPACTED FILL, CHANNEL, NON-BLM LAND, OPTION NO. 2 (Bid Item 2059)..

Payment for Compacted Fill, Channel, non-BLM Land, option no. 2, will be made at the applicable contract price, which payment shall constitute full compensation for shaping, grading, filling behind the channel walls including access ramps, over covered channels, and other areas shown on the drawings, and compacting the fill, complete. **Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.**

1.12.2.6 COMPACTED FILL, F-4 DEBRIS BASIN EMBANKMENT AND INVERT, BLM LAND (Bid Item 2008).

Payment for Compacted Fill, F-4 Debris Basin Embankment and Invert, BLM Land, will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for placing, shaping, grading, foundation preparation backfill, and compacting the fill, including settlement monuments and related work, complete. **Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.**

1.12.2.7 COMPACTED FILL, GRADING EASEMENTS (GE), F-4 CHANNEL AND F-3 CHANNEL AND 5TH CELL STRUCTURE AREA, NON-BLM MATERIALS (Bid Item 0008); COMPACTED FILL, GRADING EASEMENTS (GE), F-4 CHANNEL OPTION NO. 2 AREA, NON-BLM MATERIALS (Bid Item 2040)).

Payment for Compacted Fill, Grading Easements (GE), F-4 Channel and F-3 Channel and 5th Cell Structure Area, non-BLM materials, will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for placing, shaping, and grading the fill, complete, in the areas designated as Grading Easements (GE) shown on sheet C21 and T11 and T12. These areas shall not receive any BLM materials.

1.12.2.8 MISCELLANEOUS FILL, F-4 DEBRIS BASIN EMBANKMENT AND INVERT, BLM LAND (Bid Item 2009).

Payment for Miscellaneous Fill, F-4 Debris Basin Embankment and Invert, BLM Land, will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for placing, shaping, and grading the fill, complete. **Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.**

1.12.2.9 BASIN DIVERSION LEVEE, BLM LAND (Bid Item 2057).

Payment for Basin Diversion Levee, BLM Land, will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for placing, shaping, and grading the stone and or caliche levee fill material obtained from the basin construction, complete, as shown on sheet DB02 and sheet DB14. **Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.**

1.12.2.10 F-4 BASIN 0.150 STONE / CALICHE (Bid Item 2058).

Payment for F-4 Basin 0.150 Stone / Caliche will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for placing, shaping, and grading the stone / caliche for the F-4 embankment downstream protection material obtained from the basin construction, complete, as shown on sheets DB01 through DB18. **Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.**

1.12.2.11 Fill or Backfill Around Structures.

No separate payment will be made for fill or backfill around structures. All such costs shall be included in the applicable contract prices for structure items to which the work applies.

1.12.2.12 Trenches.

No separate payment will be made for backfilling for utilities, side drains and confluences. All costs in connection therewith shall be included in the contract prices for items to which the work applies.

1.12.2.13 Subgrade Preparation.

No separate payment will be made for subgrade preparation and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

1.13 PLANT NURSERY AREA, TEMPORARY (Bid Item 1026).

Payment for Plant Nursery Area, Temporary will be made at the applicable contract price, which payment shall constitute full compensation for the provision of a temporary plant nursery area. Location of temporary plant nursery area shall be determined by Contractor but must be within contractual awarded project Right-of-Way areas. The size of this temporary plant nursery area shall determined by Contractor to support all temporary plant nursery activities, including all related vehicle movement and access. The Contractor, at his own cost, must fence off the temporary nursery plant area with a chain link 9 gage 1.829 m high fence with barbed wire and access gate that will safely store the salvaged desert plants, including site preparation, installation of temporary fence, fence posts, excavation for fence posts, concrete for fence posts, fabric, gate and barbed wire, and removal of temporary plant nursery area including all fence, posts, concrete, gates, barbed wire and debris, prior to conclusion of construction but after replanting of salvaged desert plants.

1.14 CONCRETE.

1.14.1 Measurement.

Measurement of concrete will be made on the basis of the actual volume, in cubic meters, of concrete within the pay lines of the concrete invert slab, walls, top slab, and slope protection as shown on the drawings.

Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structures. No deductions will be made for rounded or beveled edges or space occupied by metalwork, nor voids or embedded items which are either less than 0.15 cubic meter in volume or one-tenth of square meter in cross section. Concrete placed in items of work other than those specifically mentioned above, and concrete wasted or used for the convenience of the Contractor will not be included in measurement for payment.

1.14.2 PAYMENT FOR CONCRETE ITEMS.

Payment for the concrete items will be made at the applicable contract prices for the various items of the schedule, which payments shall constitute full compensation for labor, materials (except reinforcing steel for which separate payment is provided), joint sealant, forming including forming for wall variations at overflow structure locations, furnishing concrete, placing concrete, finishing concrete, curing concrete, and for all equipment and tools to complete the concrete work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided. No payment will be made for concrete, as such, which is placed in structures for which payment is made on a lump sum basis.

1.14.2.1 CONCRETE, OPEN CHANNEL INVERT SLAB EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0009).

Payment for concrete, open channel invert slab except for option No. 1 and option No. 2 will include concrete placed in all open channel invert slab, except for concrete inverts in structures for which payment is made on a lump sum basis, and payment will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for all concrete (including all necessary items described in Paragraph "PAYMENT FOR CONCRETE ITEMS" above) placed for the invert slab of the open channel and inlet structure spillway, keys, starter walls, and cut-off walls, complete.

1.14.2.2 CONCRETE, OPEN CHANNEL INVERT SLAB OPTION NO. 2 (Bid Item 2010)..

Payment for concrete, open channel invert slab option no. 2 will include concrete placed in all open channel invert slab and for the inlet structure spillway invert slab, except for concrete inverts in structures for which payment is made on a lump sum basis, and payment will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for all concrete (including all necessary items described in Paragraph "PAYMENT FOR CONCRETE ITEMS" above) placed for the invert slab of the open channel and inlet structure spillway, keys,

starter walls, and cut-off walls, complete.

1.14.2.3 CONCRETE, OPEN CHANNEL WALLS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0010).

Payment for concrete, open channel walls except for option no. 1 and option no. 2 will include concrete placed in all open channel walls, except for concrete walls in structures for which payment is made on a lump sum basis, and payment will be made at the applicable contract price, which payment shall constitute full compensation for all concrete (including all necessary items described in Paragraph "PAYMENT FOR CONCRETE ITEMS" above) placed above the starter walls in the vertical walls of the open channel, complete.

1.14.2.4 CONCRETE, OPEN CHANNEL WALLS OPTION NO. 2 (Bid Item 2011).

Payment for concrete, open channel walls option no. 2 will include concrete placed in all open channel walls and for the inlet structure spillway walls, except for concrete walls in structures for which payment is made on a lump sum basis, and payment will be made at the applicable contract price, which payment shall constitute full compensation for all concrete (including all necessary items described in Paragraph "PAYMENT FOR CONCRETE ITEMS" above) placed above the starter walls in the vertical walls of the open channel, complete.

1.14.2.5 Concrete, Cut-off Wall.

No separate payment will be made for concrete, cut-off walls and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

1.14.2.6 CONCRETE OVERFLOW STRUCTURE (Bid Item 0041)

Payment for Concrete Overflow Structure will be made at the applicable contract price, which payment shall constitute full compensation for all concrete (including all necessary items described in Paragraph "PAYMENT FOR CONCRETE ITEMS" above) placed for the concrete overflow structure, including furnishing and placing reinforcing steel, complete except earthwork. The Concrete Overflow Structure centerline is located at F-4 Channel Station **23+33.380 Right looking upstream.**

1.15 REINFORCING STEEL EXCEPT OPTION No. 2 (Bid Item 0011);
REINFORCING STEEL OPTION NO. 2 (Bid Item 2012)..

1.15.1 Measurement.

Measurement of reinforcing steel in metric tonnes (1,000 kilograms) is limited to reinforcement in concrete structures paid for on a cubic meters basis. Measurement will be made of the lengths of bars actually placed in the completed work in accordance with the plans and specifications, approved bar schedules, or as directed. The measured lengths will be converted to weights for the bar numbers listed by the unit weights per linear foot contained in ASTM A 615. Steel in laps indicated on the drawings, in the specifications, or required by the Contracting Officer

will be included in measurement for payment. No measurement will be made for the additional steel in laps which are authorized for the convenience of the Contractor. No measurement will be made of steel supports or spacers. All costs for furnishing and installing supports and spacers shall be included in the various structures requiring the reinforcement.

1.15.2 Payment.

Payment for Reinforcing Steel will be made at the applicable contract price, which payment shall constitute full compensation for furnishing and installing steel reinforcement, complete. No payment will be made for steel reinforcement which is placed in structures for which payment is made on a lump sum basis.

**1.16 AGGREGATE BASE COURSE EXCEPT FOR BID ITEM NO. 1058 AND OPTION NO. 2 (Bid Item 0012);
FLAMINGO DETENTION BASIN AGGREGATE BASE COURSE SERVICE ROAD (Bid Item 1058);
AGGREGATE BASE COURSE OPTION NO. 2 (Bid Item 2013)).**

1.16.1 Measurement.

Measurement of aggregate base course or type II course will be by the metric tonne (1,000 kilograms) of aggregate base course placed within the lines and grades indicated on the drawings.

1.16.2 Payment.

Payment for Aggregate Base Course or Type II Course will be made at the applicable contract price which payment shall constitute full compensation for furnishing and placing the aggregate base course or type II course, complete, including subgrade preparation, including compaction of aggregate base course or type II course.

**1.17 ASPHALT CONCRETE PAVEMENT EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0013);
ASPHALT CONCRETE PAVEMENT OPTION NO. 2 (Bid Item 2014)..**

1.17.1 Measurement.

Measurement for asphalt concrete pavement will be by the metric tonne (1,000 kilograms) of asphalt concrete pavement placed within the lines and grades as indicated on the drawing.

1.17.2 Payment.

Payment for Asphalt Concrete Pavement will be made at the applicable contract price which payment shall constitute full compensation for asphalt concrete pavement in place, complete including tack coat, prime coat and appurtenant work except for aggregate base course. No payment will be made for excessive thickness.

**1.18 WEEPHOLE SYSTEM EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0014);
WEEPHOLE SYSTEM OPTION NO. 2 (Bid Item 2015)..**

Payment for the Weephole System will be made at the applicable contract price, which payment shall constitute full compensation for materials, and installation of the weephole system, complete including applicable earthwork, drain aggregate, geotextile, form openings and appurtenances, complete.

1.19 TRANSITION WALL STRUCTURE # 1 (F-4 CHANNEL UPSTREAM AT BELTWAY) (Bid Item 0015).

Payment for the Transition Wall Structure # 1 (Upstream F-4 Channel at Beltway) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. **23+16.760** to Sta. 23+07.420, including details of Section F shown on drawing "S5", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; **including furnishing and installing dowels and epoxy and concrete drilling for dowels;** and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.20 CONFLUENCE STRUCTURE # 1 (F-4 CHANNEL AND PATRICK LATERAL) (Bid Item 0016).

Payment for Confluence Structure # 1 (F-4 Channel and Patrick Lateral) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. **24+08.037 to Sta. 23+16.760**, and a portion of Patrick Lateral from Sta. **10+34.537** to Sta. 10+00.000, including confluence section shown on drawing "S4", including invert transition section shown on drawing "S4", including structure section B shown on drawing "S4" complete, except earthwork and except manholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; protect in place existing utilities; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.21 TRANSITION WALL STRUCTURE # 2 (F-4 CHANNEL DOWNSTREAM PATRICK) (Bid Item 0017).

Payment for the Transition Wall Structure # 2 (F-4 Channel and Patrick Lateral Downstream Patrick) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. 24+26.580 to Sta. 24+08.037, including details of Section B shown on drawing "S4", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.22 TRANSITION WALL STRUCTURE # 2A (PATRICK LATERAL DOWNSTREAM PATRICK) (Bid Item 0018)..

Payment for the Transition Wall Structure # 2A (Patrick Lateral Downstream Patrick) will be made at the applicable contract price, which payment shall

constitute full compensation for the structure consisting of the portion of Patrick Lateral from Sta. 10+52.537 to Sta. 10+34.537, including details of Section B shown on drawing "S4", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.23 RCB # 1 (PATRICK LATERAL) (Bid Item 0019).

Payment for RCB # 1 (Patrick Lateral) will be made at the applicable contract price, which payment shall constitute full compensation for the RCB # 1 Structure from Sta. **11+64.900 to Sta. 10+52.537**, including details of Section F Single Box Conduit shown on drawing "S3", complete, except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, **including installing bulkhead shown on the drawings**, and all incidentals, **including headwalls**; except temporary Patrick Lane traffic detour and except installing new traffic barriers and maintaining existing traffic barriers on North side and South Side of channel at Patrick Lane, and except extra traffic control devices that will be left in place after Contractor leaves site on North side and South side of channel at Patrick Lane, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.24 RCB # 2 (F-4 CHANNEL AT PATRICK) (Bid Item 0020).

Payment for RCB # 2 (F-4 Channel at Patrick) will be made at the applicable contract price, which payment shall constitute full compensation for the RCB # 2 Structure from Sta. 25+05.342 to Sta. **24+26.580**, including details of Section C Single Box Conduit shown on drawing "S3", complete, except earthwork, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, including **headwalls and/or** extended headwalls; except temporary Patrick Lane traffic detour and except installing new traffic barriers and maintaining existing traffic barriers on North side and South Side of channel at Patrick Lane, and except extra traffic control devices that will be left in place after Contractor leaves site on North side and South side of channel at Patrick Lane, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.25 TRANSITION WALL STRUCTURE # 3 (F-4 CHANNEL UPSTREAM PATRICK) (Bid Item 0021)..

Payment for the Transition Wall Structure # 2 (F-4 Channel Upstream Patrick) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. 25+19.342 to Sta. 25+05.342 including portion of confluence and invert transition details shown on drawing "S6", and including details of applicable u-wall channel concrete and reinforcing schedule shown on drawing "S2", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.26 CONFLUENCE STRUCTURE # 2 (F-4 CHANNEL AND F-3 CHANNEL AND 5TH CELL)
(Bid Item 0022).

Payment for Confluence Structure # 2 (F-4 Channel and F-3 Channel and 5th Cell) will be made at the applicable contract price, which payment shall constitute full compensation for the RCB structure consisting of the F-4 Channel from Sta. 29+59.185 to Sta. 25+19.342, including confluence plan showing confluence and invert transition details shown on sheet "S6", including confluence section G shown on drawing "S8", including confluence section J shown on drawing "S8", including invert transition section H shown on drawing "S8", including invert transition section K shown on drawing "S8", complete, except earthwork and except manholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; protect in place existing utilities; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.27 F-4 CHANNEL AND F-3 CHANNEL AND 5TH CELL STRUCTURE (Bid Item 0023).

Payment for F-4 Channel and F-3 Channel and 5th Cell Structure will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. **30+57.051 to Sta. 29+59.185, and F-3 Channel from Sta. 10+98.486 to Sta. 10+00.000 and 5th Cell from Sta. 10+99.726 to Sta. 10+00.000**, including details shown on drawing sheet "S6", including section B shown on drawing "S6", complete, except earthwork and except manholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; protect in place existing utilities; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.28 INVERT ACCESS RAMP # 1 (Bid Item 0024).

Payment for Invert Access Ramp # 1, includes the adjacent F-3 open channel from Sta. 11+47.155 to Sta. 11+02.201 and the 5th Cell open channel from Sta. 11+48.487 to Sta. 11+03.533, including details shown on drawing sheet "S11". Payment will be made at the applicable contract price, which payment shall constitute full compensation for the invert access ramp and open channel, except earthwork and except weepholes, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; including pipe access gate installed at top of access ramp to restrict vehicle access into channel invert and all appurtenances, including painting of pipe access gate; and all incidentals, including padlocks, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.29 F-3 CHANNEL 4 X RCB, AND 5TH CELL RCB UNDER FORT APACHE STRUCTURE (Bid Item 0025).

Payment for F-3 Channel 4 x RCB, and 5th Cell RCB under Fort Apache structure will be made at the applicable contract price, which payment constitutes full compensation for the structure that includes the F-3 Channel RCB from Sta. 12+06.749 to Sta. 11+47.155 and the 5th Cell RCB from

Sta. 12+08.188 to Sta. 11+48.487, including Section D shown on drawing sheet "S7", complete, except earthwork and except weepholes, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, including extended headwalls; except temporary Fort Apache Road traffic detour and except installing and maintaining temporary traffic barriers and maintaining existing traffic barriers on North side and South Side of channel at Fort Apache Road, and except extra traffic control devices that will be left in place after Contractor leaves site on North side and South side of channel at Fort Apache Road, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.30 TRANSITION WALL STRUCTURE # 4 (F-3 CHANNEL AND 5TH CELL UPSTREAM FORT APACHE) (Bid Item 0026).

Payment for the Transition Wall Structure # 4 (F-3 Channel Upstream Fort Apache) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-3 Channel from Sta. 13+44.970 to Sta. 12+06.749 including details of Section E and Section F shown on drawing "S7", and including details of Pier Noses on drawing sheets "S9" and "S10", and including 5th Cell Structure from 5th Cell Sta. 13+02.995 to Sta. 12+08.188, and including details of applicable u-wall channel concrete and reinforcing schedule shown on drawing "S2", complete, except earthwork (with exception for leaving 5th Cell Open) and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; including leaving 5th Cell open with ground slope entrance as shown in the drawing; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.31 F-3 CHANNEL INLET STRUCTURE (Bid Item 0027).

Payment for the F-3 Channel Inlet Structure will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-3 Channel from Sta. 13+75.079 to Sta. **13+44.970** including details of applicable u-wall channel concrete and reinforcing schedule shown on drawing "S2", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; **including furnishing and installing dowels and epoxy and concrete drilling for dowels**; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.32 TRANSITION WALL STRUCTURE # 5 (F-4 CHANNEL DOWNSTREAM FORT APACHE) (Bid Item 0028).

Payment for the Transition Wall Structure # 5 (F-4 Channel Downstream Fort Apache) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. 31+00.000 to Sta. **30+57.051** including details of applicable u-wall channel concrete and reinforcing schedule shown on drawing "S2", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings

except for post and cable railing and chain link fencing.

1.33 RCB # 3A (F-4 CHANNEL RCB STA. 34+06.655 TO STA. 31+00.000) (Bid Item 0029)..

Payment for RCB # 3A (F-4 Channel RCB Sta. 34+06.655 to Sta. 31+00.000) will be made at the applicable contract price, which payment shall constitute full compensation for the RCB # 3A Structure from Sta. 34+06.655 to Sta. 31+00.000 except earthwork, complete, including details of Section D Single Box Conduit shown on drawing "S3", including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, including extended headwalls; except temporary Post Road traffic detour and except installing temporary traffic barriers and maintaining existing traffic barriers on East side and West Side of channel at Post Road, and except extra traffic control devices that will be left in place after Contractor leaves site on East side and West side of channel at Post Road, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.34 RCB # 3B (F-4 CHANNEL RCB STA. 45+80.000 TO STA. 34+06.655) (Bid Item 1009)..

Payment for RCB # 3B (F-4 Channel RCB Sta. 45+80.000 to Sta. 34+06.655) will be made at the applicable contract price, which payment shall constitute full compensation for the RCB # 3B Structure from Sta. 45+80.000 to Sta. 34+06.655, except earthwork, complete, including details of Section B and Section D Single Box Conduit shown on drawing "S3", including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, except temporary Sunset Road and Maule Avenue traffic detour and except installing temporary traffic barriers and maintaining existing traffic barriers on West side and East Side of channel at Sunset Road and Maule Avenue, and except extra traffic control devices that will be left in place after Contractor leaves site on East side and West side of channel at Sunset Road and Maule Avenue, complete as shown on the drawings except for specified shoring, for which there is a separate bid item.

1.35 RCB # 3C (F-4 CHANNEL RCB STA. 52+99.440 TO STA. 45+80.000) (Bid Item 0030)..

Payment for RCB # 3C (F-4 Channel RCB Sta. 52+99.440 to Sta. 45+80.000) will be made at the applicable contract price, which payment shall constitute full compensation for the RCB # 3 Structure from Sta. 52+99.440 to Sta. 45+80.000, except earthwork, complete, including details of Section B Single Box Conduit shown on drawing "S3", including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, including **headwall and/or** extended headwalls; except temporary Warm Springs Road and Maule Avenue traffic detour and except installing temporary traffic barriers and maintaining existing traffic barriers on West side and East Side of channel at Sunset Road and Maule Avenue, and except extra traffic control devices that will be left in place after Contractor leaves site on East side and West side of channel at Sunset Road and Maule Avenue, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.36 TRANSITION WALL STRUCTURE # 6 (F-4 CHANNEL UPSTREAM WARM SPRINGS) (Bid Item 0031).

Payment for the Transition Wall Structure # 6 (F-4 Channel Upstream Warm Springs) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. **53+13.408** to Sta. 52+99.440 including details of applicable u-wall channel concrete and reinforcing schedule shown on drawing "S2", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.37 INVERT ACCESS RAMP 2 (Bid Item 0032).

Payment for Invert Access Ramp 2, also includes the adjacent open channel from Sta. 53+95.706 to Sta. 53+34.000, including details shown on drawing sheet "S12". Payment will be made at the applicable contract price, which payment shall constitute full compensation for the invert access ramp and open channel, except earthwork and except weepholes, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; including pipe access gate installed at top of access ramp to restrict vehicle access into channel invert and all appurtenances, including painting of pipe access gate; and all incidentals, including padlocks, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.38 TRANSITION WALL STRUCTURE # 7 (F-4 CHANNEL DOWNSTREAM RCB # 4) (Bid Item 2016).

Payment for the Transition Wall Structure # 7 (F-4 Channel Downstream RCB # 4) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. 56+14.953 to Sta. 56+01.453, including details of applicable u-wall channel concrete and reinforcing schedule shown on drawing "S2", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.39 RCB # 4 (F-4 CHANNEL AT FORT APACHE) (Bid Item 2017).

Payment for RCB # 4 (F-4 Channel at Fort Apache) will be made at the applicable contract price, which payment shall constitute full compensation for the RCB # 4 Structure from Sta. 57+79.160 to Sta. 57+36.765 and from Sta. 56+58.445 to Sta. 56+14.953, except earthwork, complete, including details of Section B Single Box Conduit shown on drawing "S3", including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete, and all incidentals, including extended headwalls; **including furnishing and installing dowels and epoxy and concrete drilling for dowels;** except temporary Fort Apache Road traffic detour and except installing temporary traffic barriers and maintaining existing traffic barriers on North side and South Side of channel at Fort Apache Road, and

except extra traffic control devices that will be left in place after Contractor leaves site on North side and South side of channel at Fort Apache Road, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.40 TRANSITION WALL STRUCTURE # 8 (F-4 CHANNEL UPSTREAM RCB # 4) (Bid Item 2018)..

Payment for the Transition Wall Structure # 8 (F-4 Channel Upstream RCB # 4) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. 57+92.414 to Sta. 57+79.160, including details of applicable u-wall channel concrete and reinforcing schedule shown on drawing "S2", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.41 INVERT ACCESS RAMP # 3 (Bid Item 2019).

Payment for Invert Access Ramp # 3, also includes the adjacent open channel from Sta. 62+98.000 to Sta. 62+34.308, including details shown on drawing sheet "S13". Payment will be made at the applicable contract price, which payment shall constitute full compensation for the invert access ramp and open channel, except earthwork and except weepholes, complete, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; including pipe access gate installed at top of access ramp to restrict vehicle access into channel invert and all appurtenances, including painting of pipe access gate; and all incidentals, including padlocks, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.42 TRANSITION WALL STRUCTURE # 9 (F-4 CHANNEL DOWNSTREAM RCB # 5) (Bid Item 2020).

Payment for the Transition Wall Structure # 9 (F-4 Channel Downstream RCB # 5) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. 64+10.750 to Sta. 63+97.850, including details of applicable u-wall channel concrete and reinforcing schedule shown on drawing "S2", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; **including furnishing and installing dowels and epoxy and concrete drilling for dowels;** and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.43 RCB # 5 (F-4 CHANNEL AT FORT APACHE) (Bid Item 2021).

Payment for RCB # 5 (F-4 Channel at Fort Apache) will be made at the applicable contract price, which payment shall constitute full compensation for the RCB # 5 Structure from Sta. 64+72.366 to Sta. 64+58.710 and from Sta. 64+26.407 to Sta. 64+10.750, except earthwork, complete, including details of Section B Single Box Conduit shown on drawing "S3", including furnishing and placing reinforcing steel; furnishing, placing, finishing

and curing concrete, and all incidentals, including extended headwalls; except temporary Fort Apache Road traffic detour and except installing temporary traffic barriers and maintaining existing traffic barriers on North side and South Side of channel at Fort Apache Road, and except extra traffic control devices that will be left in place after Contractor leaves site on North side and South side of channel at Fort Apache Road, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.44 TRANSITION WALL STRUCTURE # 10 (F-4 CHANNEL UPSTREAM RCB # 5) (Bid Item 2022).

Payment for the Transition Wall Structure # 10 (F-4 Channel Upstream RCB # 5) will be made at the applicable contract price, which payment shall constitute full compensation for the structure consisting of the F-4 Channel from Sta. 64+83.766 to Sta. 64+72.366 including details of applicable u-wall channel concrete and reinforcing schedule shown on drawing "S2", complete, except earthwork and except weepholes; including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; and all incidentals, complete as shown on the drawings except for post and cable railing and chain link fencing.

1.45 DEBRIS BASIN EMBANKMENT SOIL CEMENT ARMOR (Bid Item 2023)

1.45.1 Measurement

Measurement of soil cement will be made on the basis of actual cubic meters of soil cement placed within the lines and grades indicated on the drawings and specifications, excluding the quantity placed in the test section.

1.45.2 Payment

Payment for soil cement will be made at the applicable contract price, which payment shall constitute full compensation for the soil cement including all materials (except portland cement and pozzolan for which separate payments are provided), costs for test section, cost to develop all soil cement mix designs, formwork, batching, hauling, placing, compacting, finishing, curing and all equipment and tools to complete the soil cement in place. Embedded items shall be included in the cost of the soil cement except when other payment is specifically provided.

1.46 PORTLAND CEMENT FOR SOIL CEMENT (Bid Item 2024)

1.46.1 Measurement

Quantity of portland cement for soil cement to be paid for will be the number of metric tonnes (1,000 kilograms) of portland cement used for soil cement unless specifically excepted, wasted or used in the soil cement test section or for all soil cement mix designs or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved weight of portland cement in kilograms per cubic meter of soil cement by the number of accepted cubic meters of soil cement placed within the lines and grades indicated on the drawings and dividing by 1,000.

1.46.2 Payment

Payments for portland cement for soil cement will be made at the applicable contract price, which payment shall constitute full compensation for furnishing the portland cement ready for use in the work, complete. No payment will be made for portland cement used for structures for which separate payment is provided.

1.47 POZZOLAN FOR SOIL CEMENT (Bid Item 2025)

1.47.1 Measurement

Quantity of pozzolan for soil cement to be paid for will be the number of metric tonnes (1,000 kilograms) of pozzolan used for soil cement unless specifically excepted, wasted, or used in the soil cement test section or for all soil cement mix designs or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved weight of pozzolan in kilograms per cubic meters of soil cement by the number of accepted cubic meters of soil cement placed within the lines and grades indicated on the drawings and dividing by 1,000.

1.47.2 Payment

Payments for pozzolan for soil cement will be made at the applicable contract price, which payment shall constitute full compensation for furnishing the pozzolan, complete. No payment will be made for pozzolan used for structures for which separate payment is provided.

1.48 DEBRIS BASIN LOW FLOW OUTLET RCB (Bid Item 2026)

Payment for Debris Basin Low Flow Outlet RCB (Reinforced Concrete Box) will be made at the applicable contract lump sum price for the size and reach of box specified, which payment shall constitute full compensation for RCB and headwalls including earthwork, complete, including: furnishing and placing reinforcing steel; furnishing and placing, finishing and curing concrete, headwalls and manholes on outlet conduits; furnishing and placing plywood plugs; and all incidentals, complete as shown on the drawings, except for manholes and ladder systems and outlet conduit side drain connection which have separate bid items. **Debris Basin Low Flow Outlet RCB Conduit shall be 0.910 m x 0.910 m from Station 3+15.281 to Station 1+00.000.**

1.49 DEBRIS BASIN LOW FLOW OUTLET TOWER (Bid Item 2027)

Payment for the Debris Basin Low Flow Outlet Tower will be made at the applicable contract price, which payment shall constitute full compensation for the outlet tower structure, complete, including excavation and compacted fill; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; **furnishing and placing galvanized steel grating and frame**; furnishing and placing 76 diameter PVC pipe; and all incidentals.

1.50 OUTLET CONDUIT SIDE DRAIN STRUCTURE, STA. 64+95.108 RT (Bid Item 2028).

Payment for the outlet conduit side drain structure, sta. 64+95.108 right, will be made at the applicable contract price, which payment shall constitute full compensation for the side drain structure, complete, as shown on the drawings, except earthwork; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete for the side drain junction structure and inlet structure; and placing temporary barriers (plugs) as necessary. The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided.

1.51 SIDE DRAINS (Bid Items 0033, 0034, 0035, 0036, 0037, 0038, 0039, 0040, 1010, 1011, 1012, 1021, 1022, 1023, 2028, 2029, 2030, 2031, 2060, 2061, 2062, 2063)..

Payment for the various side drains and stub-outs will be made at the applicable contract price, which payment shall constitute full compensation for the side drain and stub-outs, complete, as shown on the drawings, including applicable portions of drawing sheets DT27, DT28, DT29, DT30, and DT31, except earthwork; furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete for the side drain junction structures and inlet structure; furnishing and placing all lengths of concrete pipe as shown on the "C" drawings, fittings and end sections and concrete thrust blocks; and placing temporary pipe barriers (plugs) for stub-outs as necessary. The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided and no payment will be made under this item for inlets, grates, concrete, and concrete pipe for which separate payment is provided.

1.52 SLOTTED CHAMBER (Bid Item 2032)

Payment for the slotted chamber will be made at the applicable contract lump sum price for each slotted chamber, which payment shall constitute full compensation for the slotted chamber, complete, including excavation and compacted fill; furnishing and placing reinforcing steel; furnishing, placing, finishing, and curing concrete for walls and slabs; joints, weepholes, pipe connections to each slotted chamber, manhole frame and cover, and all incidentals as shown on the drawings.

**1.53 MANHOLES FOR RCB CONDUITS, CULVERTS, AND LATERALS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0047);
MANHOLES FOR RCB CONDUITS, CULVERTS, AND LATERALS OPTION NO. 1 (Bid Item 1013);
MANHOLES FOR RCB CONDUITS, CULVERTS, AND LATERALS OPTION NO. 2 (Bid Item 2033).33).**

Payment for Manholes for Box Conduits, Culverts, and Laterals will be paid for according to the applicable contract lump sum price including, excavation, backfill and appurtenances complete and in place, except for ladder systems. No extra payment will be made for pipe fittings required to make connections to manholes.

**1.54 ROAD DETOURS EXCEPT FOR OPTION NO. 1 (Bid Item 0084);
ROAD DETOURS OPTION NO. 1 (Bid Item 1020)..**

Payment for Road Detours will be made at the applicable contract lump sum price, and shall be considered full payment for all work shown on the DT drawing sheets, including: remove and salvage various materials including but not limited to signage, chain link fence, riprap; all roadway embankment fill including all earthwork and provision of borrow materials, including costs associated with embankment material for detour road may be borrowed from the project area; construct as necessary drainage ditch along toe of detour road slope to provide positive drainage, protect the slope; type II aggregate base and related work; 63 mm (2-1/2 inch) plantmix bituminous surface (PBS) and related work, with sawcut and match existing at both ends; portable precast concrete barrier rails; ground mounted construction signs (10 signs); type 1 lane line (paint); 150 mm (6-inch) wide white painted edge line; flag men as required; including removal of the detour road and removal of the detour road embankment, including restoration of the area to the grades existing prior to detour road and detour road embankment construction; and removal of all detour road appurtenances, and including restoration of all applicable road sites including PBS, signage, striping, fencing, and flagmen, complete as shown on drawing sheets DT titled with titles including "Detour Road (Phase 1)", "Sunset Road Detour Road (Phase 2)", "Detour Road (Phase 2)", "Road Reconstruction", "Detour Signage & Striping", "Reconstruction Signage & Striping", "Detour Road Removals", complete as shown on drawing sheets D titled with titles including "Detour Road Waterline Relocation", "Detour Signing & Striping", and "Detour Signage & Striping".

1.55 CHAIN LINK FENCE, 1.829 M HIGH, 9 GAGE EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0048);
CHAIN LINK FENCE, 1.829 M HIGH, 9 GAGE OPTION NO. 2. (Bid Item 2034)..

1.55.1 Measurement.

Measurement of chain link fence, 1.829 M High, 9 Gage will be by the linear meters of chain link fence, 1.829 M high, 9 Gage, constructed as shown on the drawings.

1.55.2 Payment.

Payment for Chain Link Fence, 1.829 M High, 9 Gage, will be made at the applicable contract price, which payment shall constitute full compensation for chain link fencing, including posts with caps, rail, chain link fabric, stretcher bars, tension bands, wire ties, truss wire, concrete, grounding, and all incidentals, complete as shown on the drawings.

1.56 POST AND CABLE RAILING EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0049);
POST AND CABLE RAILING OPTION NO. 2 (Bid Item 2035)..

1.56.1 Measurement

Measurement of post and cable railing will be by the linear meter, measured from end to end, of railing installed as shown on the drawings.

1.56.2 Payment

Payment for post and cable railing will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for railing, including posts, cable, safety chain gates, anchor plate, bolts, and other galvanized appurtenances, fabrication, grout or dry pack, including painting of posts on non-Rhodes Ranch property and including painting of posts on Rhodes Ranch property to match ornamental fence paint color, and all incidentals, including padlocks, complete.

1.57 DOUBLE SWING GATES EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0050);

DOUBLE SWING GATES OPTION NO. 2 (Bid Item 2036)..

1.57.1 Measurement

Measurement of double swing gates will be the number of double swing gates acceptably installed.

1.57.2 Payment.

Payment for Double Swing Gate will be made at the applicable contract price, which payment shall constitute full compensation for fabricating and installing the double swing gates, complete, including posts with caps, chain link fabric, frame members, tension bands, truss rods, stretcher bars, wire ties, truss wire, sleeves, hinges, grout, concrete, stops and padlocks, and all incidentals, complete, as shown on the drawings.

1.58 [Enter Appropriate Subpart Title Here]1.58 PRE-EMERGENT HERBICIDE AND PIGMENTED DUST PALLIATIVE/SOIL STABILIZER ON NON-REVEGETATED AREAS OF CHANNEL EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0051);
PRE-EMERGENT HERBICIDE AND PIGMENTED DUST PALLIATIVE/SOIL STABILIZER ON NON-REVEGETATED AREAS OF OPTION NO. 1 (Bid Item 1014);
PRE-EMERGENT HERBICIDE AND PIGMENTED DUST PALLIATIVE/SOIL STABILIZER ON NON-REVEGETATED AREAS OF DEBRIS BASIN EMBANKMENT, INVERT, AND CHANNEL OPTION NO. 2 (Bid Item 2037).

1.58.1 Measurement

Measurement of pre-emergent herbicide and pigmented dust palliative/soil stabilizer will be made on the basis of the actual area in hectares of areas treated with pre-emergent herbicide and pigmented dust palliative/soil stabilizer used for disturbed areas that will not be revegetated as indicated or directed.

1.58.2 Payment

Payment for pre-emergent herbicide and pigmented dust palliative/soil stabilizer will be at the applicable contract unit price per hectare, which payment shall constitute full compensation including furnishing materials, processing, and application, complete in place.

1.59 STATION MARKINGS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0052);

STATION MARKINGS OPTION NO. 1 (Bid Item 1018);

STATION MARKINGS OPTION NO. 2 (Bid Item 2038)..

Payment for Station Markings will be made at the applicable contract lump sum price, which shall be considered full payment for preparation, paint and marking, equipment and labor.

1.60 AS-BUILT DRAWINGS ENTIRE PROJECT (Bid Item 0053).

1.60.1 Measurement

Measurement shall be made on a lump sum basis.

1.60.2 Payment

Payment for As-Built Drawings entire project will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all labor, material, and equipment complete in place for the complete set of as-built drawings, including electronic MicroStation SE or MicroStation J "DGN" file format and PEN FILES/TABLES on Compact Disk, indicating installation of work items not installed according to the contract drawings.

1.61 LADDER SYSTEMS EXCEPT FOR OPTION NO. 1 AND OPTION No. 2 (Bid Item 0046);

LADDER SYSTEMS OPTION NO. 1 (Bid Item 1015);

LADDER SYSTEMS OPTION NO. 2 (Bid Item 2039).).

Payment for Ladder Systems will be made at the applicable contract lump sum price for installation of all channel access ladders, including access ladders for Manholes for Box Conduits. The contract price for ladder system shall be considered full payment for fabrication, assembly fittings, finishing, paint and marking, installation of ladder steps, and all equipment, labor and fittings.

1.62 DELETED

1.63 PROVIDE PLANT STORAGE IRRIGATION DURING CONSTRUCTION (Bid Item 1027)

Payment for providing plant storage area irrigation during construction will be made at the applicable contract price, which payment shall constitute full compensation for furnishing water, labor and equipment to maintain plants as specified.

1.64 PROVIDE IRRIGATION FOR ONE YEAR AFTER CONSTRUCTION AT F-4 DEBRIS BASIN (Bid Item 2041)

Payment for providing irrigation for one year after construction at F-4 Debris Basin will be made at the applicable contract price, which payment shall constitute full compensation for furnishing water, labor and necessary equipment to maintain plants placed for revegetation as specified.

1.65 ONE YEAR GUARANTEE ON LANDSCAPE WORK AT BLUE DIAMOND BASIN (Bid Item 1054);

ONE YEAR GUARANTEE ON LANDSCAPE WORK AT FLAMINGO BASIN (Bid Item 1055);

ONE YEAR GUARANTEE ON LANDSCAPE WORK AT F-4 DEBRIS BASIN (Bid Item 2042)42)

Payment for providing a one year guarantee on landscape work at respective basins will be made at the applicable contract price, which payment shall constitute full compensation for furnishing personnel to complete landscape work as specified, and providing required reports.

**1.66 TORTOISE FENCE, OPTION NO. 1 F-4 CHANNEL (Bid Item 1024);
TORTOISE FENCE, F-4 DEBRIS BASIN (Bid Item 1025))**

1.66.1 Measurement

Measurement of tortoise fence that is provided will be by the linear meter of tortoise fence constructed as shown on the drawings.

1.66.2 Payment

Payment for tortoise fence will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for tortoise fence, including steel tee posts and all incidentals complete as shown on the drawings, and scheduling and coordination of the work to comply with Section 01200 GENERAL REQUIREMENTS, paragraph ENVIRONMENTAL ASSESSMENT REQUIREMENT. Payment shall also include complete removal of tortoise fence at the completion of this project.

1.67 SALVAGE, STORE, AND MAINTAIN PLANTS (Bid Items 1028 - 1032)

1.67.1 Measurement

Measurement for salvaging, storing, and maintaining plants will be the number of plants of each type specified, actually salvaged, stored and maintained in a healthy condition.

1.67.2 Payment

The accepted quantities of plants measured for salvaging, storing, and maintaining plants, will be paid at the applicable contract unit price per the type of plant, for plants actually salvaged, stored and maintained in a healthy condition. Such payment shall be full compensation for all the labor, materials, and incidentals necessary to complete the work, except transplanting plants and irrigation water to maintain the plants will be paid separately.

1.68 TRANSPLANT TO F-4 BASIN (Bid Items 2043 - 2047)

1.68.1 Measurement

Measurement for transplanting plant materials will be the number of plants of each type specified, actually planted on the project.

1.68.2 Payment

The accepted quantities of plants measured for transplanting plant materials will be paid at the applicable contract unit price per the type of plant, identified in each bid item and actually planted on the project.

Such payment shall be full compensation for all the labor, materials, and incidentals necessary to complete the work, except irrigation water to maintain the plants will be paid separately.

1.69 PLACE TOPSOIL TO FINISH GRADE, F-4 DEBRIS BASIN DOWNSTREAM EMBANKMENT SURFACE (Bid Item 2048)

1.69.1 Measurement

Measurement for placing topsoil to finished grade will be made on the basis of the cubic meters of material placed and graded to a minimum depth of 203 millimeters over surfaces designated for revegetation treatment or as shown on the drawings. Excess material from strip and stockpile for topsoil that is wasted or placed as miscellaneous fill will not be included for measurement under this item.

1.69.2 Payment

Payment for placing topsoil to finished grade will be at the applicable contract price per cubic meter, which payment shall constitute full compensation for materials, equipment, and labor.

1.70 PROVIDE BROWSE PROTECTION, F-4 DEBRIS BASIN (Bid Item 2050)

Payment for providing browse protection will be made at the applicable contract price for each browse control device including equipment, supplies and labor.

1.71 SIMULATED DESERT VARNISH ROCK COLOR MITIGATION (Bid Item 2051)

1.71.1 Measurement

Measurement of simulated desert varnish rock color mitigation will be made on the basis of the actual area in hectares of exposed excavation, fill, and rock surfaces in the construction areas that are treated.

1.71.2 Payment

Payment for simulated desert varnish rock color mitigation will be at the applicable contract price per hectares, which payment shall constitute full compensation for the simulated desert varnish rock color mitigation including furnishing materials, processing, hauling, and placing, complete in place.

1.72 SOIL SAMPLING AND TESTING FOR FERTILITY, F-4 DEBRIS BASIN (Bid Item 2052))

1.72.1 Measurement

Measurement of soil sampling and testing for fertility will be made at the applicable contract unit price per each soil sample taken as shown on the drawings and tested for fertility.

1.72.2 Payment

Payment for soil sampling and testing for fertility will be made at the applicable contract price for each soil sample taken and tested, which payment shall constitute full compensation for materials, equipment, and labor.

1.73 PIGMENTED DUST PALLIATIVE/SOIL STABILIZER ONLY ON REVEGETATED AREAS (Bid Item 2053)

1.73.1 Measurement

Measurement of pigmented dust palliative/soil stabilizer will be made on the basis of the actual area in hectares used for revegetation as indicated or directed.

1.73.2 Payment

Payment for pigmented dust palliative/soil stabilizer will be at the applicable contract price per hectare, which payment shall constitute full compensation including grading, scarifying, furnishing materials, processing, hauling and applying, complete in place.

1.74 PROVIDE CHANNEL EXCAVATION SHORING (Bid Item 1006)

Payment for providing channel excavation shoring on east side of channel from **Sta. 44+34.229 to Sta. 42+27.440 and from Sta. 40+28.845 to Sta. 38+35.000** to protect property and improvements will be made at the applicable contract price, which payment shall constitute full compensation for furnishing shoring, labor and necessary equipment, for duration of related construction work in area, to protect property and improvements as specified, and removal of said shoring when related work is completed.

1.75 CLEAR SITE AND REMOVE OBSTRUCTIONS AT BLUE DIAMOND AND FLAMINGO DETENTION BASINS (Bid Item 1034).

Payment for Clear Site and Remove Obstructions at Blue Diamond and Flamingo Detention Basins, shall include all costs for clearing, removal, replacement, and restoration work (except work by others) including all existing obstructions within the construction work area, except for clearing, removal, replacement and restoration work specifically specified in other bid items throughout this project. Except as otherwise specified, or except as otherwise indicated in other bid items, payment for clearing and removal work includes applicable earthwork; filling holes; removal of abandoned utility lines; removal of existing surface trash and debris, including trees and vegetation and debris piles (consisting of construction debris and/or dumped soils, dumped gravels, dumped rocks and dumped boulders), including vehicle debris (vehicle bodies and/or vehicle parts) and appliance debris (whole and/or parts), and grubbing from within the Basin right-of-way and temporary construction easement; removal, protection, replacement or restoration of existing structures and features indicated and disposal of all materials. Payment for Clear Site and Remove Obstructions at Blue Diamond and Flamingo Detention Basins will be made at the applicable contract price, which payment shall constitute full compensation for clearing, obstruction removal, and protection work,

complete.

**1.76 ADJUST SEWER MANHOLE FRAMES AND COVERS EXCEPT FOR OPTION NO. 1 AND
OPTION No. 2 (Bid Item 0044);
ADJUST SEWER MANHOLE FRAMES AND COVERS OPTION NO. 1 (Bid Item 1017)..**

Measurement and payment shall be made according to the contract unit price for each manhole acceptably adjusted to finished grade elevation. Existing covers, including frames, grates, or lids shall be adjusted to the required elevation by removing such existing covers and adjusting the top of the existing structures by removing or adding concrete, riser, cone, grade rings, or by using cast iron adaptor rings, as the case may be, reinstalling the fixtures by supporting them on a satisfactory collar of Class A concrete constructed as to hold them firmly in place.

**1.77 BLUE DIAMOND PROVIDE AND PLANT (Bid Items 1035-1042); FLAMINGO BASIN
PROVIDE AND PLANT (Bid Items 1045-1051)**

1.77.1 Measurement

Measurement for providing plant materials will be the number of plants of each type specified, actually planted on the project.

1.77.2 Payment

The accepted quantities of plants measured for plant materials will be paid at the applicable contract unit price per the type of plant, identified in each bid item and actually planted on the project. Such payment shall be full compensation for all the labor, materials, and incidentals necessary to complete the work, except irrigation water to maintain the plants will be paid separately and all incidentals.

**1.78 BLUE DIAMOND PROVIDE SEEDING AND FERTILIZATION (Bid Item 1043);
FLAMINGO BASIN PROVIDE SEEDING AND FERTILIZATION (Bid Item 1052);
SEEDING AND FERTILIZATION, F-4 DEBRIS BASIN EMBANKMENT DOWNSTREAM SURFACE
(Bid Item 2049)9)**

1.78.1 Measurement

Measurement for seeding and fertilization will be the number of hectares completed, applied at the specified seed and fertilizer rates in the designated areas, measured along the ground slope.

1.78.2 Payment

Payment for seeding and fertilization will be at the applicable contract price per hectares, which payment shall constitute full compensation for materials, equipment, and labor including tillage, and amendments, except irrigation water for seed establishment will be paid separately and all incidentals, and plant establishment.

**1.79 BLUE DIAMOND PROVIDE 1 YEAR IRRIGATION AND MAINTENANCE (Bid
Item 1044);
FLAMINGO BASIN PROVIDE 1 YEAR IRRIGATION AND MAINTENANCE (Bid Item 1053)3)**

Payment for providing irrigation and maintenance for one year after construction including a one year guarantee on landscape work will be made at the applicable contract price, which payment shall constitute full compensation for furnishing water, labor and necessary equipment to maintain and establish landscaping placed for mitigation, including weeding, fertilizing, plant replacement, and maintenance reports as specified.

1.80 UTILITY CROSSING ITEMS EXCEPT OPTION NO. 1 AND OPTION NO. 2 (Bid Item 0043);

UTILITY CROSSING ITEMS OPTION NO. 1 (Bid Item 1019);

UTILITY CROSSING ITEMS OPTION NO. 2 (Bid Item 2054).).

Payment for Utility Crossing Items will be made at the applicable contract lump sum price, and shall be considered full payment for all work including protect in place, support and concrete encase.

**1.81 BLUE DIAMOND DETENTION BASIN LANDSCAPE FILL (Bid Item 1056);
FLAMINGO DETENTION BASIN LANDSCAPE FILL (Bid Item 1057))**

1.81.1 Measurement

Measurement for placing landscape fill will be made on the basis of the cubic meters of material placed and graded to a minimum depth of 203 millimeters over surfaces designated for revegetation treatment or as shown on the drawings. Excess material from strip and stockpile for topsoil that is wasted or placed as miscellaneous fill will not be included for measurement under this item.

1.81.2 Payment

Payment for placing landscape fill will be at the applicable contract price per cubic meter, which payment shall constitute full compensation for materials, equipment, and labor.

1.82 CLEAR SITE AND REMOVE OBSTRUCTIONS, POST AND FORT APACHE (Bid Item 0040).

Payment for Clear Site and Remove Obstructions, Post and Fort Apache, shall include all costs for clearing, removal, replacement, and restoration work (except work by others) including all existing obstructions within the construction work area, except for clearing, removal, replacement and restoration work specifically specified in other bid items throughout this project. Except as otherwise specified, or except as otherwise indicated in other bid items, payment for clearing and removal work includes applicable earthwork; filling holes; removal of abandoned utility lines; removal of existing surface trash and debris, including trees and vegetation and debris piles (consisting of construction debris and/or dumped soils, dumped gravels, dumped rocks and dumped boulders), including vehicle debris (vehicle bodies and/or vehicle parts) and appliance debris (whole and/or parts), and grubbing from within the Channel right-of-way and temporary construction easement; including removal of existing riprap rock as shown on the drawings, removal of existing filter fabric and or

geotextile fabric under riprap, removal of existing cutoff walls, headwalls, and wingwalls as shown on the drawings, including DT sheets; removal of existing concrete pavement and concrete curb and gutter and plant mix bituminous surface (pbs) as shown on the drawings, including sawcutting and removal of necessary portion of the existing precast and/or cast in place concrete drainage structures to allow for placement of new channel and side drain structure; including removal and disposal of existing culvert shown on sheet DT1 and removal and disposal of existing riprap upstream and downstream of this culvert; including removal and disposal of existing large chunks of caliche material and chunks of concrete at the north side of the Post Road embankment east of Fort Apache Road within the Right Of Way, TCE and Grading Easements; including removal and disposal of existing manhole at location north of intersection of Fort Apache Road and Post Road and removal and disposal of existing surrounding concrete barrier rail and removal and disposal of existing 48" RCP within ROW/TCE; including removal and disposal of existing drop inlet structure (either type DM or type CM) and removal and disposal of related existing 48" RCP within ROW and TCE and removal and disposal of related existing PVC pipe within ROW/TCE all of which are located immediately north east of intersection of Fort Apache Road and Post Road; including removal and disposal of existing riprap located at the northeast corner of the Fort Apache Road and Post Road alignment intersection; including removal of existing riprap and dirt piles located in F-3 Channel alignment downstream of Post Road RCB; removal, protection, replacement or restoration of existing structures and features indicated and disposal of all materials. Payment for Clear Site and Remove Obstructions, will be made at the applicable contract price, which payment shall constitute full compensation for clearing, obstruction removal, and protection work, complete.

1.83 SINGLE SWING GATE (Bid Item 0045).

1.83.1 Measurement

Measurement of single swing gates will be the number of single swing gates acceptably installed.

1.83.2 Payment.

Payment for Single Swing Gate will be made at the applicable contract price, which payment shall constitute full compensation for fabricating and installing the single swing gates, complete, including posts with caps, chain link fabric, frame members, tension bands, truss rods, stretcher bars, wire ties, truss wire, sleeves, hinges, grout, concrete, stops and padlocks, and all incidentals, complete, as shown on the drawings.

1.84 BASIN DEPTH GAGES (Bid Items 2064)

Payment for detention basin depth gages will be made at the applicable contract price which payment shall constitute full compensation for installing the depth gages, complete, including applicable earthwork, reinforced concrete, and placing numerical markings as shown on the drawings.

1.85 BASIN STILLING WELL (Bid Items 2065)

Payment for basin stilling well will be made at the applicable contract price, which payment shall constitute full compensation for the basin stilling well, complete, including excavation and compacted fill; furnishing and placing reinforcing steel; staff gauge; manhole, access door, locking bar for manhole, locking box system for access door, shelf, stilling well ladder and safety cage, beehive inlets, rigid steel inlet pipes with slurry backfill, locking bar systems for beehive inlets; connections, furnishing, placing, finishing, and curing concrete for, cutoff, walls, slabs, and sills as shown on the drawings; including chain link fence and single swing gate; and all incidentals, complete, as shown on the drawings.

1.86 STORM WATER POLLUTION PREVENTION FACILITIES, EXCEPT OPTION NO. 1 AND OPTION NO. 2 (Bid Item 0055);
STORM WATER POLLUTION PREVENTION FACILITIES, OPTION NO. 1 (Bid Item 1016);
STORM WATER POLLUTION PREVENTION FACILITIES, OPTION NO. 2 (Bid Item 2055)..

Payment for storm water pollution prevention facilities will be made at the applicable contract lump sum price, which payment shall constitute full compensation for the storm water pollution prevention facilities during the construction duration, complete, including furnishing and placing and maintaining for the construction duration silt fences, sand bags, bales of hay, signage, and including employee education and awareness; and all incidentals, complete.

1.87 ROAD DETOURS AND ROAD RECONSTRUCTION EXCEPT OPTION NO. 1 (Bid Item 1059);
ROAD DETOURS AND ROAD RECONSTRUCTION OPTION NO. 1 (Bid Item 0042)..

Payment for Road Detours and Road Reconstruction will be made at the applicable contract lump sum price, and shall be considered full payment for: saw cutting, demolition, removal, hauling and disposal of asphaltic concrete; temporary traffic control during road removal including sign persons; including covering of existing signage and removal of existing signage and existing road markings in accordance with the DT drawings; including protect and support existing side walk, curb and gutter in place, protect and support existing water, gas, electric, fiber optic and other communication lines, vaults and other utility related items, and manholes; all required excavation and compacted fill for road detour and road reconstruction; adjusting blow-off assemblies if present and necessary; adjust valve boxes, pull boxes, vaults, water boxes for the detour and again for the road reconstruction, with exception to adjusting manholes for which there are other separate bid items; and for road detour: furnishing and placing the aggregate base course, complete, including subgrade preparation; including asphalt concrete or plantmix bituminous surface (PBS) in place and matching existing pavement and/or gutter, complete, including tack coat, prime coat and appurtenant work such as pavement striping, including removal of conflicting road markings; including relocate street light pull box, and traffic control and signage, and barricades; including installing temporary signage; including cmp arch culvert and riprap in accordance with drawing requirements, including relocate existing traffic signal pulboxes, including extending existing pvc conduit and pull strings; including maintaining all of the road detour features indicated above and shown on the DT drawings; and if Contractor chooses to construct detour road between Post Road and Sunset prior to award of Option No. 1, the Contractor shall include a temporary curve transition alignment from the detour road onto the current Fort Apache Road alignment and payment would include this temporary curve transition from detour back onto current Fort Apache Road alignment and shall also include temporary hospital entrance alignmentss and payment will also include final configuration of hospital entrance alignment to support the road detours to include any temporary barriers, installation & removal of traffic markings, striping, signage, complete, per approved Contractor plan submittal; and for road reconstruction: furnishing and placing the aggregate base course, complete, including subgrade preparation; including asphalt concrete or

plantmix bituminous surface (PBS) in place and matching existing pavement and/or gutter, complete, including tack coat, prime coat and appurtenant work such as pavement striping; including permanent striping, road markings, traffic control and signage in accordance with the DT drawings, including removal of conflicting road markings; including removal and disposal of road detours and associated road detour features including road materials, signage, striping and road markings, and barriers, when no longer needed, complete, as shown on the DT drawings.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

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SECTION 01312

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SECTION 01312

RESIDENT MANAGEMENT SYSTEM (RMS)

PART 1 GENERAL

The Government will use the Resident Management System for Windows (RMS-W) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS-Windows, referred to as RMS-QC (QC for Quality Control), to record, maintain, and submit various information throughout the contract period. This joint Government-Contractor use of RMS-W and RMS-QC will facilitate electronic exchange of information and overall management of the contract. RMS-QC provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

- Administration
- Finances
- Quality Control
- Submittal Monitoring
- Scheduling
- Import/Export of Data

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U. S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1

(3 Nov 2003) U.S. Army Corps of Engineers
Safety and Health Requirements Manual

1.2 Correspondence and Electronic Communications

For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.3 Other Factors

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", Section 01330, SUBMITTAL PROCEDURES, and Section 01451, CONTRACTOR QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through

RMS-QC. Also, there is no separate payment for establishing and maintaining the RMS-QC database; all costs associated therewith shall be included in the contract pricing for the work.

1.4 RMS-QC SOFTWARE

RMS-QC is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the RMS-QC software to the Contractor after award of the construction contract. Prior to the Pre-Construction Conference, the Contractor shall be responsible to download, install and use the latest version of the RMS-QC software from the Government's RMS Internet Website (winrms.usace.army.mil). Upon specific justification and request by the Contractor, the Government can provide RMS-QC on 3-1/2" high-density diskettes or CD-ROM. Any program updates of RMS-QC will be made available to the Contractor via the Government RMS Website as they become available.

1.5 SYSTEM REQUIREMENTS

The following listed hardware and software is the minimum system configuration that the Contractor shall have to run RMS-QC:

Hardware

IBM-compatible PC with 200 MHz Pentium or higher processor
32+ MB RAM
4 GB hard drive disk space for sole use by the RMS-QC system
3 1/2 inch high-density floppy drive
Compact disk (CD) Reader
Color monitor
Laser printer compatible with HP LaserJet III or better, with minimum 4 MB installed memory.
Connection to the Internet, minimum 28 BPS

Software

Microsoft (MS) Access 97 or newer version database software
MS Windows 95 or newer version operating system (MS Windows NT 4.0 or newer is recommended)
Word Processing software compatible with MS Word 97 or newer
Internet browser

The Contractor's computer system shall be protected by virus protection software that is regularly upgraded with all issued

manufacturer's updates throughout the life of the contract.

Electronic mail (E-mail) compatible with MS Outlook

1.6 RELATED INFORMATION

1.6.1 RMS-QC User Guide

After contract award, the Contractor shall download instructions for the installation and use of RMS-QC from the Government RMS Internet Website; the Contractor can obtain the current address from the Government. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.6.2 Contractor Quality Control(CQC) Training

The use of RMS-QC will be discussed with the Contractor's QC System Manager during the mandatory CQC Training class.

1.7 CONTRACT DATABASE

Prior to the pre-construction conference, the Government shall provide the Contractor with basic contract award data to use for RMS-QC. The Government will provide data updates to the Contractor as needed, generally by files attached to E-mail. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.8 DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the RMS-QC database throughout the duration of the contract. The Contractor shall establish and maintain the RMS-QC database at the Contractor's site office. Data updates to the Government shall be submitted by E-mail with file attachments, e.g., daily reports, schedule updates, payment requests. If permitted by the Contracting Officer, a data diskette or CD-ROM may be used instead of E-mail (see Paragraph DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM). The RMS-QC database typically shall include current data on the following items:

1.8.1 Administration

1.8.1.1 Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of RMS-QC software from the Government, the Contractor shall deliver Contractor administrative data in electronic format via E-mail.

1.8.1.2 Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be

listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in RMS-QC. Within 14 calendar days of receipt of RMS-QC software from the Government, the Contractor shall deliver subcontractor administrative data in electronic format via E-mail.

1.8.1.3 Correspondence

All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main) office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

1.8.1.4 Requests for Information

RMS-QC includes a means for the Contractor to enter, log, and transmit requests for information (RFI) to the Government. RFIs can be exchanged electronically using the import/export functions of RMS-QC. The Contractor shall also provide the Government with a signed, printed copy of each RFI. All RFIs from the Contractor to the Government shall have the prefix "RFI" and shall be numbered sequentially beginning with RFI-0001.

1.8.1.5 Equipment

The Contractor's RMS-QC database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.8.1.6 EM 385-1-1, U.S. Army Corps of Engineers Safety Health Requirements Manual and RMS Linkage

Upon request, the Contractor can obtain a copy of the current version of the Corps of Engineers Safety Manual, EM 385-1-1, on CD. Data on the CD will be accessible through RMS-QC, or in stand-alone mode.

1.8.1.7 Management Reporting

RMS-QC includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of RMS-QC. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.8.2 Finances

1.8.2.1 Pay Activity Data

The RMS-QC database shall include a list of pay activities that the Contractor shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line

Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.8.2.2 Payment Requests

All progress payment requests shall be prepared using RMS-QC. The Contractor shall complete the payment request worksheet and include it with the payment request. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using RMS-QC. The Contractor shall submit the payment requests with supporting data by E-mail with file attachment(s). If permitted by the Contracting Officer, a data diskette may be used instead of E-mail. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

1.8.3 Quality Control (QC)

RMS-QC provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other contractor QC requirements. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the RMS-QC generated daily report. The Contractor shall provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01451, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, the Contractor shall submit a data diskette or CD-ROM reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.8.3.1 Daily Contractor Quality Control (CQC) Reports.

RMS-QC includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by RMS-QC shall be the Contractor's official report. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the RMS-QC-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by Section 01451, CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Government using E-mail or diskette within 24 hours after the date covered by the report. Use of either mode of submittal shall be coordinated with the government representative. The Contractor shall also provide the Government a signed, printed copy of the daily CQC report.

1.8.3.2 Deficiency Tracking.

The Contractor shall use RMS-QC to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC Comments.

The contractor shall maintain a current log of its QC comments in the RMS-QC database. The Government will log the deficiencies it has identified using its QA comments. The Government's QA comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA comments.

1.8.3.3 Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in RMS-QC.

1.8.3.4 Accident/Safety Tracking.

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall utilize RMS-QC to advise the Government of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 200.

1.8.3.5 Features of Work

The Contractor shall include a complete list of the features of work in the RMS-QC database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.8.3.6 QC Requirements

The Contractor shall develop and maintain a complete list of QC testing, transferred and installed property, and user training requirements in RMS-QC. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government via RMS-QC.

1.8.4 Submittal Management

The Government will provide the initial submittal register, ENG Form 4288, SUBMITTAL REGISTER, in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns as described in Section 01330, SUBMITTAL PROCEDURES. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall use RMS-QC to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update, ENG Form 4288, shall be produced using RMS-QC. RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.8.5 Schedule

The Contractor shall develop a construction schedule consisting of pay activities, in accordance with Contract Clause "Schedules for Construction Contracts". This schedule shall be input and maintained in the RMS-QC database either manually or by using the Standard Data Exchange Format (SDEF). The updated schedule data shall be included with each pay request submitted by the Contractor.

1.8.6 Import/Export of Data

RMS-QC includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data, and schedule data using SDEF.

1.9 IMPLEMENTATION

Contractor use of RMS-QC as described in the preceding paragraphs is mandatory. The Contractor shall ensure that sufficient resources are available to maintain its RMS-QC database, and to provide the Government with regular database updates. RMS-QC shall be an integral part of the Contractor's management of quality control.

1.10 DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM

The Government-preferred method for Contractor's submission of updates, payment requests, correspondence and other data is by E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of computer diskettes or CD-ROM for data transfer. Data on the disks or CDs shall be exported using the RMS-QC built-in export function. If used, diskettes and CD-ROMs will be submitted in accordance with the following:

1.10.1 File Medium

The Contractor shall submit required data on 3-1/2" double-sided high-density diskettes formatted to hold 1.44 MB of data, capable of running under Microsoft Windows 95 or newer. Alternatively, CD-ROMs may be used. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.10.2 Disk or CD-ROM Labels

The Contractor shall affix a permanent exterior label to each diskette and CD-ROM submitted. The label shall indicate in English, the RMS-QC file name, full contract number, project name, project location, data date, name and telephone number of person responsible for the data.

1.10.3 File Names

The Government will provide the file names to be used by the Contractor with the RMS-QC software.

1.11 MONTHLY COORDINATION MEETING

The Contractor shall update the RMS-QC database each workday. At least monthly, the Contractor shall generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, the contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions. The contractor shall make all required corrections prior to Government

acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable RMS-QC export file is received.

1.12 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

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PART 2 PRODUCTS

PART 3 EXECUTION

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SECTION 01321

NETWORK ANALYSIS SCHEDULES (NAS)

PART 1 GENERAL

1.1 DESCRIPTION

Prepare a progress chart pursuant to the clause entitled "FAR 52.236-15, Schedules for Construction Contracts" of the Contract Clauses that shall consist of a network analysis system. The network analysis system shall consist of the network analysis schedule (diagram), mathematical analysis, and associated reports. The scheduling of construction shall be the responsibility of the Contractor. Submission of progress and revision data will be used to measure work progress, aid to evaluate time extensions, and provide basis of all progress payments. The Critical Path Method (CPM) of network calculation shall be used to generate the project schedule and will utilize the Precedence Diagram technique to satisfy both time and cost applications. All progress payment amounts will be derived from and tied to the cost-loaded schedule activities.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualifications; G, RE.

Standard Activity Coding Dictionary

Schedule Development Session scheduler/planner; G, RE.

Preliminary Network Analysis Schedule; G, RE.

Network Analysis Schedule; G, RE.

Accepted Network Analysis Schedule; G, RE.

Summary Network.

SD-07 Certificates

Monthly Network Analysis Updates.

SD-11 Closeout Submittals

As-Built Schedule.

1.3 SCHEDULE ACCEPTANCE

Review comments made by the Government on the Contractor's construction schedule will not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for scheduling, sequencing, and prosecuting the Work to comply with the requirements of the Contract Documents. Government acceptance extends only to the activities of the contractor's schedule that the Government has been assigned responsibility for and agrees it is responsible. The Government will also review for contract imposed schedule constraints and conformance, and cost loading of the CPM activities. Comments offered on other parts of the schedule which the Contractor is assigned responsibility are offered as a courtesy and are not conditions of government acceptance; but are for the general conformance with established industry schedule concepts.

1.3.1 Schedule Acceptance Prior to Start of Work

The Accepted Network described in the paragraph entitled "Accepted Network Analysis Schedule" must be submitted and accepted by the government before the contractor will be allowed to start work.

1.3.2 Acceptance

- a. When the Accepted Network Analysis Schedule is submitted and accepted by the Contracting Officer, it will be considered the "Baseline CPM Schedule". The Baseline CPM Schedule will then be used by the Contractor for planning, organizing, and directing the work; reporting progress; and requesting payment for work accomplished. The schedule will be updated monthly by the Contractor and submitted monthly with the progress pay request to reflect the current status of the work. The submittal and acceptance of the Accepted Network Analysis Schedule and accurate updated schedules accompanying the pay requests are both conditions precedent to processing pay requests. Only bonds will be paid prior to acceptance of the Accepted Network Analysis Schedule.
- b. Submittal of the Network, and subsequent schedule updates, will be understood to be the Contractor's representation that the submitted schedule meets all of the requirements of the Contract Documents, accurately reflects the work accomplished, and that Work will be executed in the sequence indicated on the submitted schedule.

1.4 SOFTWARE

The scheduling software that will be utilized by the government on this project is Primavera Project Planner (P3) by Primavera Systems, Inc. If the contractor chooses to use an equally capable program, the contractor shall convert all data into Primavera Machine Readable Format (Lotus, D-Base, Excel, etc.) prior to submission of all schedule inputs, included

but not limited to the initial schedule, monthly updates, and changes to the schedule. It is the responsibility of the Contractor to ensure all data elements and logic required by this specification are kept intact during the conversion to Primavera. If scheduling software other than Primavera is being used, provide a licensed copy of the Contractor's scheduling software and data. The software will be the most current version available and will be compatible with all MS-Windows operating systems (e.g., Win 95, Win NT, Win 2000 etc.). The scheduling software package shall contain all user manuals normally provided by the software distributor. If the Contractor upgrades their software during the course of the contract, the upgrade shall also be provided to the Contracting Officer. The software will remain the property of the government.

1.4.1 Computer Hardware

The Contractor shall provide and maintain a personal computer (PC) capable of running the network analysis software specified herein. All necessary software and hardware will be provided to make the system a complete and useable package. The Contractor shall also provide a printer and plotter with necessary cables. The PC will remain the property of the Contractor.

1.4.2 Software Training

If software other than Primavera is used by the Contractor, provide schedule software training for two Government personnel. A firm accredited by the scheduling software manufacturer, as their authorized trainer shall conduct the training. The training shall last a minimum of 24 hours per individual. Provide course material the training firm normally distributes at their software classes. Provide all necessary materials and equipment to conduct the training. The Contractor shall provide training within 10 working days after notification to the Contractor, by the Contracting Officer. Unless agreed to by the Contracting Officer, the training site shall be at the Contracting Office.

1.5 QUALIFICATIONS

The Contractor shall designate a Scheduler that will be responsible for the development, preparation, and maintenance of an accurate, computerized Network Analysis Schedule. The Scheduler shall have previously developed, created and maintained at least 2 previous computerized schedules of similar size and complexity of this contract. A resume outlining the qualifications of the scheduler shall be submitted for acceptance to the Contracting Officer. If at a later date, the Contracting Officer considers the Contractor's Scheduler to be incompetent or objectionable, the Contractor will propose a new Scheduler, meeting the qualification requirements. Payments will not be processed until an acceptable Scheduler is provided.

1.6 NETWORK SYSTEM FORMAT

The system shall consist of time scaled logic diagrams accompanying mathematical analyses and specified reports.

1.6.1 Diagrams

Show the order and interdependence of activities and the sequence in which the work is to be accomplished as planned. The basic concept of a network analysis diagram will be followed to show how the start of a given activity is dependent on the completion of preceding activities and how its completion restricts or restrains the start of following activities. Diagrams shall be organized by Work Phase and sorted by Early Start Date and will show a continuous flow from left to right with no logic (relationship lines) from right to left. With the exception of the Project Start and Project Completion milestone activities, no activities will be open-ended; each activity will have predecessor and successor ties. The diagram shall clearly show the activities of the critical path. No onsite construction activity shall have duration in excess of 20 working days. Once an activity exists on the schedule it may not be deleted and must remain in the logic. No more than 20 percent of the activities may be critical or near critical. Critical will be defined as having zero days of Total Float. "Near critical" will be defined as having Total Float in the range of 1 to 14 days. Show the following information on the diagrams for each activity:

- a. Activity/Event Number
- b. Activity Description
- c. Original Duration in work days
- d. Actual Duration in Work Days
- e. Early Start Date
- f. Early Finish Date
- g. Total Float (or Slack)
- h. Responsibility Code

Provide network diagrams on ANSI E sheets. Updated diagrams shall show the date of the latest revision.

1.6.2 Quantity and Numbering of Activities

Numbering shall be assigned so that, in general, predecessor activity numbers are smaller numerically than the successor activity numbers. Skip numbering shall be used on the network to allow insertion of additional activities for contract modifications and logic changes. The minimum number of construction activities in the final network diagram shall be 20. Types of activities included in the schedule are specified below.

1.6.2.1 Procurement Activities

Tasks related to the procurement of material or equipment shall be included as separate activities in the project schedule. Examples of procurement activities include, but are not limited to: Material/equipment submittal preparation, submittal and approval of material/equipment; delivery of O&M

manuals; material/equipment fabrication and delivery, delivery of extra parts, extra stock, special tools, notification of Government Furnished Material/Equipment delivery requirement, etc. As a minimum, separate procurement activities will be provided for every specification section. If the Contractor intends on using Just-In-Time (JIT) delivery methods, the schedule will show each JIT delivery with relationship tie to the Construction Activity specifically for the JIT delivery. Material and equipment for which payment will be requested in advance of installation shall be cost-loaded with the procurement costs. All activities within a procurement process/cycle will have a unique identifier in the activity code to show their relationships and will extend to the related construction activities (i.e., Work Category).

If the Government's action on any submittal is "Disapproved" or "Revise and Resubmit", a new series of Procurement Activities will be inserted into the schedule. Predecessor for the new submittal preparation activity will be the original approval activity and the successor of the new approval activity will be the fabrication/deliver activity for the equipment or material.

1.6.2.2 Government Activities

Government and other agency activities that could impact progress shall be clearly identified. Government activities include, but are not limited to; Government approved submittal reviews, Government conducted inspections/tests, utility outages, Notice(s) to Proceed and delivery of Government Furnished Material/Equipment. Show activities indicating Government furnished materials and equipment utilizing delivery dates indicated in "FAR 52.245-2, Government Property (Fixed-Price Contracts)." Government activities will be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.

1.6.2.3 Construction Activities

Construction activities shall include, but are not limited to: Tasks related to mobilization/demobilization; the installation of temporary or permanent work by tradesman; testing and inspections of installed work by technicians, inspectors or engineers; start-up and testing of equipment; commissioning of building and related systems; scheduling of specified manufacture's representatives; final clean-up; training to be provided; and administrative tasks necessary to start, proceed with, accomplish or finalize the contract. Contractor activities will be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.

1.6.2.4 Anticipated Weather Delays

Schedule activity duration(s) shall be formulated with allowance for normal adverse weather conditions. Any activity duration which could be impacted by normally anticipated adverse weather (precipitation, high or low temperature, wind, etc.), due to the time period which the Contractor has scheduled the work, shall include an adjustment to include the anticipated weather delay. The Contractor shall anticipate delay by comparing the contractually imposed environmental restrictions in the Contract Documents to the National Oceanic and Atmospheric Association's (NOAA) historical

monthly averages for the NOAA location. The number of anticipated adverse weather delays allocated to an activity will be reflected in the activity's calendar. A lost workday, due to weather conditions, is defined as a day in which the contractor's workforce cannot work 50 percent or more of the day. The Contractor shall immediately notify the Contracting Officer when a lost day has occurred due to weather and will record on the Daily Reports, the occurrence of adverse weather and resultant impact to the normally scheduled work. If the number of actual adverse weather delay days exceeds the number of days anticipated, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days and issue a modification in accordance with the contract clauses.

MONTHLY ANTICIPATED ADVERSE WEATHER DATS
Work Days Based on five (5) Day Work Week

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
9	4	1	1	1	1	4	1	1	1	2	8

1.6.2.5 Activity Properties

Schedule activities will have the following properties:

- a. **Standard Activity Coding Dictionary:** The Contractor shall submit a coding scheme for Schedule Activity Numbers that shall be used throughout the project. The coding scheme submitted shall list the values for each activity code category and translate those values into project specific designations. Code length shall not exceed 10 characters. Once accepted, the coding scheme will be used for the duration of the project.
- b. **Activity Description:** Each activity shall have a narrative description consisting of a Verb or work function (e.g.; form, pour, excavate), an Object (e.g.; slab, footing, underfloor plumbing), and Area (e.g.; 3rd floor, northeast quadrant, basement). Activity descriptions for linear facilities such as channels, etc., defining work as "Excavation Station XX to Station XX" shall be representative of the direction of work that the contractor intends to perform for the reach of channel, etc., that is defined within this description (i.e. downstream to upstream, etc.)
- c. **Work Phase:** If phasing is specified in the contract, all activities shall be identified in the project schedule by the phase of work in which the activity occurs. Activities shall not be contained in more than one Work Phase.
- d. **Work Category:** All Activities shall be identified in the project schedule according to the work category which best describes the activity. Examples of work categories are procurement, government, and construction activities that are all related to a single Definable Feature of Work. Activities shall not be contained in more than one Work Category.

- e. Area Code: All activities shall be identified in the project schedule by the Area Code in which the activity occurs. Activities shall not be contained in more than one Area Code. Area is defined as a distinct separation in construction, such as a story of construction, separate structure, usage or function difference, utility distribution systems, etc.
- f. Responsibility Code: All activities in the project schedule shall be identified with the party responsible to perform the task. Responsibility includes, but is not limited to; the prime contractor, subcontracting firm, or Government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by a responsibility code. For example, a responsibility code value, "ELEC", may be identified as "Electrical Subcontractor."
- g. CSI Code: All activities in the project schedule shall be identified with its respective 5-digit Specification Section number. Activities shall not belong to more than one Section number. If an activity does not have an applicable CSI Code, (such as "Mobilize"), the code will be "00000".
- h. Drawing Code: All activities in the project schedule shall be identified with its respective project drawing code. The drawing code is the Sheet Number on the primary project drawing which indicates the work to be performed. Activities shall not belong to more than one Drawing Code. Examples of Drawing Codes are "C-10", "C.10" or "C10". The code system will allow organizing all activities by drawing code in alpha and numeric order. If an activity does not have an applicable Drawing Code, (such as "Mobilize"), the code will be "00000".
- i. Modification Code: The Modification Code shall identify activities that are modified or added by contract modification. Activities shall not belong to more than one Modification Code. The Government will assign the modification number, which will be shown on the SF 30. Use a shortened version of the modification number for the code (e.g.; A00010 = 010).
- j. Request for Equitable Adjustment (REA) or Claim Code: Activities that are modified or added, as a result of a Contractor's REA or Claim shall be identified by a code generated by the Contractor. Activities shall not belong to more than one REA or Claim Code.
- k. The Three Phases of Control (Preparatory, Initial, and Follow-up): For each Definable Feature of Work identified in the Contractor's Quality Control Plan, include an activity for the Preparatory Phase. The Initial Phase and Follow-up Phase will be represented by the Construction Activities in the schedule.
- l. Project Milestone Dates: Dates shall be shown on the diagram for the start of the project, any contract required interim start and completion dates, contract completion date and other significant

milestones.

- m. **Scheduled Project Duration:** The schedule duration shall extend from notice-to-proceed to the contract completion date.
- n. **Project Start Date Milestones:** The schedule shall start no earlier than the contract award date and the project duration (Day 1) will start on the Notice-to-Proceed (NTP) date. The Contractor shall include as the first activity in the schedule, an activity named "Contract Award" and another activity on the NTP date named "Start Project". Both activities will be zero duration, with constrained start dates equal to the contract award and NTP dates.
- o. **Constraint of Last Activity Milestone:** The Contractor shall include as the last activity in the project schedule, an activity named "End Project". The "End Project" activity shall be zero duration with a mandatory finish constraint equal to the contract completion date for the project. Calculation of project updates shall be such that if the finish of the last activity falls after the contract completion date, then the float calculation shall reflect negative float on the critical path.
- p. **Early Project Completion:** In the event the Contractor's project schedule shows completion of the project prior to the contract completion date, the Contractor shall include an activity named "Contractor Early Completion". The activity shall be a zero duration milestone with an unconstrained date representing the Contractor's Early Completion date.
- q. **Substantial Completion:** If the contractor elects to include an activity for Substantial Completion, then it is agreed that Substantial Completion will be the point in time that the Government considers the project is complete and ready for its intended use. The activity will be named "Substantial Completion". The activity shall be a zero duration milestone with an unconstrained date representing the Contractor's Substantial Completion date.
- r. **Phase Start Milestone:** The Contractor shall include as the first activity for a project phase, an activity named "Start Phase X", where "X" identifies the phase of work. The "Start Phase X" activity shall be zero duration with an unconstrained start date equal to the date of the Phase NTP. This unconstrained start date is not a release from contractually required start dates, but is left unconstrained to allow the schedule logic to calculate without hindrance.
- s. **End Phase Milestone:** The Contractor shall include as the last activity in a project phase, an activity named "End Phase X" where "X" identifies the phase of work. The "End Phase X" activity shall be zero duration with an unconstrained late finish date equal to the contract phase completion date. This unconstrained completion date is not a release from contractually required finish dates, but is left unconstrained to allow the schedule

logic to calculate without hindrance.

- t. Early Phase Completion: If the contractor expects to finish prior to the contract phase completion date, the milestone will show an early finish date equal to the Contractor's early finish date. The name of the activity will be "Early Phase Completion" and will be zero duration with an unconstrained date representing the contractor's early phase completion date.
- u. Summary (a.k.a., Banding or Hammock) Activities: The Contractor shall include special activities that are a summary of a chain of activities. The start of the activity will be the start date of the first activity in the chain and the finish date will be the finish date of the last activity in the chain. Generalized work sequences, Categories of Work and all Phase of Work activity chains will be summarized.
- v. Activity/Event Constraints: Date/time constraint(s), other than those required by the contract, will not be allowed unless accepted by the Contracting Officer.
- w. Leads and Lags: Leads or lags will not be used when the creation of an activity will perform the same function (e.g., concrete cure time). Lag durations contained in the project schedule shall not have a negative value. The use of any lead or lag will be explained in the Narrative Report.
- x. Default Progress Data Disallowed: Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software system. Actual Start and Actual Finish dates on the CPM schedule shall match the dates provided from Contractor Quality Control and Production Reports. These reports will be the sole basis for updating the schedule. Work activities will be updated by actual work progression rather than being cash flow driven. The updating of the percent complete and the remaining duration of any activity shall be independent functions; program features that calculate one of these parameters from the other shall be disabled. Out-of-Sequence progress (if applicable) shall be handled through Retained Logic, not the Default Option of Progress Override. Actual labor and equipment hours used on activities will be derived from the daily reports.

1.6.3 Mathematical Analysis

The network diagram mathematical analysis shall include a tabulation of each activity shown on the detailed network diagrams. Provide the following information as a minimum for each activity:

- a. Activity/Event number
- b. Activity/Event description
- c. Estimated duration of activities (by work days)

- d. Earliest start date (by calendar date)
- e. Earliest finish date (by calendar date)
- f. Actual start date (by calendar date)
- g. Actual finish date (by calendar date)
- h. Latest start date (by calendar date)
- i. Latest finish date (by calendar date)
- j. Total float or slack
- k. Material/Equipment costs will be assigned to their respective Procurement Activities (i.e., the delivery activity). Costs for installation of the material/equipment (labor, construction equipment, and temporary materials) will be assigned to their respective Construction Activities. The value of inspection/testing activities will not be less than 10 percent of the total costs for Procurement and Construction Activities. Evenly disperse overhead and profit to each activity over the duration of the project.
- l. Responsibility code (including prime contractor, subcontractors, suppliers, Government, or other party responsible for accomplishment of an activity.)
- m. Area Code
- n. Manpower required (crew size)
- o. Percentage of activity duration completed
- p. Contractor's earnings based on accepted work-in-place.

The program or means used in making the mathematical computation shall be capable of compiling the total value of completed and partially completed activities. The program shall also be capable of accepting revised completion dates as modified by approved time extensions and recompilation of tabulation dates/costs and float accordingly. The total of all cost loaded activities; including costs for material and equipment delivered for installation on the project, and manpower and construction equipment loaded construction activities, shall total to 100 percent of the value of the contract.

1.6.4 Additional Requirements

In addition to the tabulation of activities, in the Paragraph entitled "Mathematical Analysis", include the following data:

- a. On-site manpower loading schedule: Each construction activity shall have an estimate of the number of workers per day by trade, man-hours per day by trade and total expected hours used by trade

during the execution of the activity. If no workers are required for an activity, then the activity shall be identified as using zero workers per day.

- b. Equipment loading schedule: Each construction activity shall have an estimate of the equipment used per day, number of units per day and total expected hours for each piece of equipment used during the duration of the activity. Include a description of the major items of construction equipment planned for each construction activity on the project. The description shall include the year, make, model, and capacity. If no equipment is required for an activity, then the activity shall be identified as using zero equipment per day.

1.6.5 Required Reports

The following reports will be made available in the schedule submittals and in each updated schedule submission provided on disk by the Contractor:

- a. By the preceding event number from lowest to highest and then in the order of the following activity number (Activity Identification Report) showing the current status of all activities.
- b. By the amount of total float, from lowest to highest and then in order of early start date (Total Float or Slack Report) showing all incomplete activities.
- c. By latest allowable start dates and then in order of activity numbers (Late Start Report).
- d. Earned Value Report listing all activities having a budget amount and cost. A compilation of total earnings on the project from the notice to proceed to the most recent monthly progress payment request and the difference between the previous request amount and the current payment request amount. Sort report first by resource and then by activity.
- e. By earliest allowable start dates and then in order of activity number (Early Start Report).
- f. By tasks scheduled to start and finish by the end of the next pay period (30-Day Look Ahead).
- g. With each updated schedule submission, provide a computer generated Log Report using a recognized schedule comparison software listing all changes made between the previous schedule and current updated schedule. Identify the name of the previous schedule and name of the current schedule being compared. This report will as a minimum show changes for: Added & Deleted Activities, Original Durations, Remaining Durations, Activity Percent Complete, Total Float (or Slack), Free Float, Calendars, Descriptions, Constraints (added, deleted or changed), Actual Starts/Finishes, Added/Deleted Resources, Resource Quantities,

Costs, Resource Percents, Added/Deleted Relations, Changed Relation Lags, Changed Driving Relations, and Changed Critical Status.

- h. By the activity number from lowest to highest, showing preceding and succeeding activity numbers for each activity (Predecessor/Successor Report), and showing the current status of each activity.

1.7 SUBMISSION AND ACCEPTANCE

1.7.1 Preliminary Meeting

At the Pre-Construction Conference, the Contracting Officer, Contractor and major subcontractors shall participate in a preliminary meeting to discuss the proposed schedule and requirements of this section prior to submission of the network. The definition of a "major subcontractor" is one that exceeds 5 percent of the contract value.

1.7.2 Schedule Development Session:

Prior to the submission of the Network Analysis Schedule, the Contractor shall conduct a Schedule Development Session. The Schedule Development Session shall include procurement of on site services of an expert scheduler/planner for not less than a 5 day period. The Contractor's choice of Schedule Development Session scheduler/planner is subject to the acceptance of the Contracting Officer. The scheduler/planner shall facilitate the session on site and shall be fluent in the English language.

The scheduler/planner shall have at least 10 years experience developing construction project schedules with scheduling software programs that the contractor intends to use. Unless agreed to by the Contracting Officer, the session shall be conducted at the Office of the Contracting Officer. The Contractor is responsible for providing the necessary equipment for the session which, as a minimum, includes a personal computer (PC), a computer display projector to facilitate group viewing, and a printing device. During the session the facilitator shall provide all necessary training to participants and shall lead the development of the project's schedule. As a minimum, the scheduler/planner shall facilitate development of activity coding and work breakdown structures; establishment of procurement, government, and construction activities; activity relationship; resourcing; budgeted costs; and reports to be used during the project. Members of the Contracting Officer's staff will attend the session as well as members of the designer of record, local sponsor, major subcontractors (those which exceed 5 percent of the contract value), and the Contractor's home and field project management staff. All costs associated with the Schedule Development Session are to be borne by the Construction Contractor.

1.7.3 Preliminary Network Analysis Schedule

Submit a preliminary network defining the planned operations during the first 90 calendar days after contract award within 20 days after contract award. The general approach for the balance of the project shall be indicated. Cost of activities expected to be completed or partially completed before submission and acceptance of the Accepted Network Analysis

Schedule should be included. Submit three copies of both the preliminary network diagrams and required reports listed in paragraph entitled "Required Reports." In accordance with paragraph entitled "Monthly Reports," the preliminary network may be used for requesting progress payments for a period not to exceed 90 calendar days after receipt of "Contract Award." Submittal and acceptance of the Preliminary Network is condition precedent to the processing of the Contractor's pay requests on this schedule. Payment requests after the first 90 calendar day period shall be based upon the Accepted Network Analysis Schedule. The activities and relationships of the preliminary schedule shall coincide and mesh with the activities of the Network Analysis Schedule. As part of this submittal, provide the Project Name format (and Project Group Name if used) that will be used by the Contractor to identify initial schedule submittals, updates, fragnets, changes, etc. Include 1 copy of the Preliminary Network Analysis Schedule on 100 MB Zip Disk.

1.7.4 Network Analysis Schedule

Submit the complete network system, consisting of the network mathematical analysis and network diagrams, within 40 calendar days after contract award. Submit three copies of the diagrams described in the paragraph entitled "Diagrams", the required reports listed in the paragraph entitled "Required Reports ", and the analysis described in the paragraph entitled "Mathematical Analysis" and information required by the paragraph entitled "Additional Requirements". As part of this submittal, provide the Project Name format (and Project Group Name if used) that will be used by the Contractor to identify initial schedule submittals, updates, fragnets, changes, etc. Include 1 copy of the Network Analysis Schedule on one ZIP disk formatted to hold 100 MB of data.

1.7.5 Review and Evaluation

After the Government's review, the Contractor shall meet with the Contracting Officer to discuss the review and evaluation of the NAS submittal. Revisions necessary as a result of this review shall be resubmitted for acceptance within 10 calendar days after the meeting.

1.7.6 Accepted Network Analysis Schedule

Once review comments are resolved and the network has been accepted by the Contracting Officer, the Contractor shall within 5 calendar days furnish:

- a. Two copies of the network diagrams
- b. Two copies of the required reports listed in paragraph entitled "Required Reports"
- c. Two copies of the "Mathematical Analysis".
- d. Two copies of the Cash Flow Report indicating the cash flow based upon both the early and late start schedules.
- e. Two copies of each major subcontractor's statement certifying their concurrence with the Contractor's Accepted Network Analysis

Schedule. Each certifying statement will be made on the subcontractor's letterhead.

- f. Two sets of data disks containing the project schedule shall be provided for the initial submission and every periodic project update. Data shall be submitted on zip disk, formatted to hold 100 MB of data. A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Preliminary, NAS Submittal, Accepted, Update, Recovery, or Change), full contract number, Project Name used to identify project in scheduling software, contract name & location, data status date, diskette number with total number of diskettes in set, software name and version used to run the schedule, and the name and telephone number of person responsible for the schedule.

For major revisions, updates or changes to the network diagrams, once accepted by the Contracting Officer, the Contractor shall submit these same diagrams and reports.

1.7.7 Monthly Network Analysis Updates

At monthly intervals the Contractor, Government representatives and major subcontractors will meet to jointly update the project schedule and agree on percentage of payment for each activity progressed during the update period. The purpose of the meeting is to determine progress payment amounts for each activity, allow all parties to evaluate project status at the data date, provide a complete and accurate update of procurement and construction progress, create an historical record of the project and establish prediction of completion date(s) based upon current status. The Contractor is responsible to gather all supporting documentation propose the update data for the schedule and record the meeting minutes. All progress payment amounts will be derived from and tied to the cost-loaded schedule activities. Submit at monthly intervals a report of the actual construction progress by updating the required reports, the time scaled logic diagram, and mathematical analysis. Meeting to update the schedule and the submission of an error free, acceptable updated schedule to the Government is a condition precedent to the processing of the Contractor's pay request. As a minimum, the following actions will be accomplished during the meeting:

- a. Identify activities started and completed during the previous period and enter the Actual Start and Actual Finish dates.
- b. Show estimated duration (in workdays) to complete each activity started but not completed (remaining duration).
- c. Indicate percentage of cost payable for each activity.
- d. Reflect changes in the network diagram. All changes (i.e., duration changes, logic changes, new logic, conformed change orders, new activities, changes due to Conformed Modifications, changes in work sequence, etc.) shall be recorded and a note added to the activity log field. The log shall include as a minimum, the date and reason for the change, and description of the change.

- e. Submit two copies of a Narrative Report describing: 1) Progress made in each area of the project; 2) Changes in the following; activities, original durations, logic interdependencies, milestones, planned sequence of operations, critical path, and resource and loading; 3) Pending items and status thereof, including permits, change orders, and time extensions; 4) Status of Contract Completion Date and interim milestones; 5) Current and anticipated delays (describe cause of the delay and corrective action(s)); and 6) Description of current and future schedule problem areas. Each entry in the narrative report will cite the respective Activity ID and Activity Description.
- f. Submit two copies of the required reports listed in paragraph entitled "Required Reports".
- g. Submit two copies of the Update Meeting minutes.

1.7.8 Summary Network

A summary network shall have the same network form as the Accepted Network Analysis Schedule. The summary network will contain a minimal number of activities that represent the general approach of work sequence. The Summary will be a time-scaled logical sequence of Work Phases. The Contractor shall submit a summary network diagram immediately after acceptance of the Accepted Network Analysis Schedule. A summary network update shall be submitted every 6 months during the contract duration and immediately following acceptance of each major schedule change. Submit the following:

- a. Two copies of the summary network diagram.
- b. Two copies of the Activity Identification Report.
- c. Two copies of the Total Float (or Slack) Report.
- d. Two copies of the Earned Value Report indicating the actual cash flow for the current updated (not summary) network based upon both the early and late start schedules.

1.7.9 As-Built Schedule

As a condition precedent to the release of retention, the last update of the schedule submitted shall be identified by the Contractor as the "As-Built Schedule". The As Built shall reflect the exact manner in which the project was actually constructed (including actual start and finish dates, activities, sequences, and logic) and shall be certified by the Contractor's Project Manager and Construction Scheduler as being a true reflection of the way the project was actually constructed. If more than one person filled the position(s) during the course of the project, each person will provide certification for the period of time they were responsible.

1.8 CONTRACT MODIFICATION

When a contract modification to the work is required, submit proposed revisions to the network with a fragnet and a cost proposal for each proposed change. All modifications shall be incorporated into the network analysis system as separately identifiable activities broken down and inserted appropriately on the first update following issuance of a directive to proceed with the change. Submit one copy of the Total Float Report, Log Report and a copy of the proposed Time Impact Analysis on disk, with the cost proposal. Unless the Contracting Officer requests otherwise, only conformed contract modification fragnets will be added into the subsequent monthly updates. All revisions to the current baseline schedule activities that are necessary to further refine the schedule so that the changed work activities can be logically tied to the schedule shall be made. Financial data shall not be incorporated into the schedule until the contract modification is signed by the Contracting Officer.

1.8.1 Time Impact Analysis:

Time Impact Analysis shall be used by the Contracting Officer in determining if a time extension or reduction to the contract milestone date(s) is justified. The Contractor shall provide a Time Impact Analysis to the Contracting Officer for any proposed contract change or as support for a Value Engineering Proposal, Claim or Request for Equitable Adjustment by the Contractor.

- a. The Contractor shall submit a Time Impact Analysis (TIA) illustrating the influence of each change or delay on the Contract Completion Date or milestones. Unless the Contracting Officer requests an interim update to the schedule, the current monthly updated schedule accepted by the government shall be used to display the impacts of the change. Unless requested by the Contracting Officer, no other non-conformed changes will be incorporated into the schedule being used to justify the change impact.
- b. Each TIA shall include a Fragmentary Network (fragnet) demonstrating how the Contractor proposes to incorporate the impact into the Project Schedule. A fragnet is defined as the sequence of new activities and/or activity revisions, logic relationships and resource changes that are proposed to be added to the existing schedule to demonstrate the influence of impacts to the schedule. The fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. Include a narrative report describing the effects of new activities and relationships to interim and contract completion dates, with each TIA.
- c. Following the Contractor's receipt of a contract modification on a Standard Form 30 signed by the Government; all changes in the fragnet used to determine impacts, shall be incorporated into the schedule. Changes will occur during the next monthly schedule update meeting.

1.8.2 No Reservation-Of-Rights

All direct costs, indirect costs, and time extensions will be negotiated and made full, equitable and final at the time of modification issuance.

1.9 CHANGES TO THE NETWORK ANALYSIS SCHEDULE

If changes in the method of operating and scheduling are desired, the Contracting Officer shall be notified in writing stating the reasons for the change. If the Contracting Officer considers these changes to be of a major nature, the Contractor may be required to revise and submit for acceptance, without additional cost to the Government, the network diagrams and required sorts. A change may be considered of a major nature if the estimated time required or actually used for an activity or the network logic is varied from the original plan to a degree that there is a reasonable doubt as to the effect on the contract completion date. Changes that affect activities with adequate float time shall be considered a major change when their cumulative effect could extend the contract completion date.

1.10 FLOAT

Use of float suppression techniques, such as; preferential sequencing (arranging critical path through activities more susceptible to government caused delay), special lead/lag logic restraints, zero total or free float constraints, extended activity times, or imposing constraint dates other than as required by the contract, shall be cause for rejection of the project schedule or its updates. The use of Resource Leveling (or similar software features) used for the purpose of artificially adjusting activity durations to consume float and influence the critical path is expressly prohibited.

1.10.1 Definitions of Float or Slack

Free Float is the length of time the start of an activity can be delayed without delaying the start of a successor activity. Total Float is the length of time along a given network path that the actual start and finish of activity(s) can be delayed without delaying the project completion date.

Project Float is the length of time between the Contractor's Early Completion (or Substantial Completion) and the Contract Completion Date.

1.10.2 Ownership of Float

Float available in the schedule, at any time shall not be considered for the exclusive use of either the Government or the Contractor. During the course of contract execution, any float generated due to the efficiencies of either party is not for the sole use of the party generating the float; rather it is a shared commodity to be reasonably used by either party. Efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated weather is less than expected, will also contribute to the reserve of float. A schedule showing work completing in less time than the Contract time, and accepted by the Government, will be considered to have Project Float. Project Float will be a resource available to both the Government and the Contractor. No time extensions will be granted nor delay damages paid unless a delay

occurs which impacts the Project's critical path, consumes all available float or contingency time, and extends the work beyond the Contract Completion Date.

1.10.3 Negative Float

Negative float will not be a basis for requesting time extensions. Any extension of time will be addressed in accordance with the Paragraph "Time Extensions". Scheduled completion date(s) that extend beyond the contract completion date(s) (evidenced by negative float) may be used in computations for assessment of payment withholdings. The use of this computation is not to be construed as a means of acceleration.

1.11 TIME EXTENSIONS

Extension of time for performance required under the clauses entitled "Changes," "Differing Site Conditions," "Default (Fixed-Price Construction)" or "Suspension of Work" will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total float or slack along the network paths involved at the time Notice to Proceed was issued for the change. The Contractor acknowledges and agrees that delays in activities which, according to the network analysis schedule, does not in fact actually affect any milestone completion dates or the contract completion date shown on the CPM network at the time of delay, will not be a basis for a contract extension. Submit time extension requests with a Time Impact Analysis and three copies of the Total Float (or Slack) Report, Narrative Report and Log Report.

1.12 MONTHLY COORDINATION MEETING

In conjunction with receipt of the Monthly Network Update submission, a coordination meeting will be held each month in the Contracting Officer's conference room to discuss the report. The Contractor shall make a presentation of the previously submitted and current Monthly Network Update to the Contracting Officer so as to provide an overview of the project's schedule and provide an opportunity to discuss items of coordination.

1.13 BIWEEKLY WORK SCHEDULE

To provide a more detailed day-to-day planning of upcoming work, the Contractor shall prepare and issue detailed work plans that coordinate with and supplement the above defined network analysis. The work plans shall be keyed to the CPM activity numbers and shall be submitted each week and shall show the projects activities that will occur during the following two-week interval. Additionally, the critical path activities are to be identified on the Biweekly Work Plan. The detail work plans are to be bar chart type schedules prepared by the Contractor in sufficient detail to define the work to be accomplished, the crews, construction tools and equipment to be used during the current and next two-week interval. The bar charts shall be formatted to allow reproduction on 8 1/2 by 11 sheets. Three copies of the bar chart schedules shall be delivered to the Contracting Officer not less than 3 work hours prior to the start of the weekly coordination meeting.

1.14 WEEKLY COORDINATION MEETING

In conjunction with the receipt of the Bi-Weekly Work Schedule, a coordination meeting will be held each week in the Contracting Officer's conference room to discuss the work schedule. The Contractor shall make a presentation of the previously submitted and current Bi-Weekly Work Schedule to the Contracting Officer so as to provide an overview of the project's schedule and provide an opportunity to discuss items of coordination. Consideration of materials, crews, and equipment shall be addressed to ascertain their respective availability. The meeting shall identify actions necessary to provide adherence to the Bi-Weekly Work Schedule and the overall network for the project defined above. The Contractor will take meeting minutes. All meeting minute entries will be keyed to the schedule activity number(s) being addressed. Within one day of the meeting, the Contractor will provide a draft copy of the meeting minutes to the Contracting Officer for review and comment. Final copies of the minutes containing the comments provided by the Contracting Officer, will be issued within 3 days of the meeting.

1.15 CORRESPONDENCE AND TEST REPORTS

All correspondence (e.g., letters, Requests for Information (RFIs), e-mails, meeting minutes, Production and QC Daily Reports, material delivery tickets, photographs, etc.) shall reference the Schedule Activity Number(s) that are being addressed. All test reports (e.g., concrete, soil compaction, weld, pressure, etc.) shall reference the Schedule Activity Number(s) that are being addressed.

1.16 Forecasting Expenditures

The Contracting Officer will provide a spreadsheet to the Contractor showing the different funding categories and their respective categories for each bid item for the total contract amount (see attached FIGURE 1). Each pay period the contractor shall forecast his expenditures for the following 3 pay periods, indicating funding requirements for each category.

The updated worksheet (see attached FIGURE 2) shall be submitted with each partial pay estimate (e.g. submitted for the period 15 DEC to 15 JAN will include a forecast of expenditures for the period 15 Jan to 15 Apr). Forecasting of expenditures is needed to assure sufficient funding for future progress payments.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
F-4 BASIN AND CHANNEL

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION	PARAGRAPH	CLASSIFICATION / REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE		
											(g)					(h)	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01200	SD-01 Preconstruction Submittals														
			Topographic Surveyor	3.18.2	G RE												
			Maule Avenue Area Road Traffic and Pedestrian Control Plan	3.17.3.2	G RE												
			Maule Avenue Area Road Closure Plan	3.17.3.2	G RE												
		01321	SD-01 Preconstruction Submittals														
			Qualifications	1.5	G RE												
			Standard Activity Coding Dictionary	1.6.2.5													
			Schedule Development Session scheduler/planner	1.7.2	G RE												
			Preliminary Network Analysis Schedule	1.7.3	G RE												
			Network Analysis Schedule	1.7.4	G RE												
			Accepted Network Analysis Schedule	1.7.6	G RE												
			Summary Network	1.7.8													
			SD-07 Certificates														
			Monthly Network Analysis Updates	1.7.7													
			SD-11 Closeout Submittals														
			As-Built Schedule	1.7.9													
		01330	SD-01 Preconstruction Submittals														
			Submittal register	1.5.1	G RE												
		01355	SD-01 Preconstruction Submittals														

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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTHER REVIEWER	ACTION CODE			DATE OF ACTION	DATE RCD FRM APPR AUTH
(a)	(b)	(c)	ITEM SUBMITTED (d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)		
		01355	Environmental Protection Plan	1.7	G RE														
			Joint Condition Survey Report	1.8	G RE														
		01356	SD-01 Preconstruction Submittals																
			Storm Water Pollution Prevention Plan	Part 3	G RE														
			Receipt of Notice of Intent	Part 3															
			SD-07 Certificates																
			Mill Certificate or Affidavit	2.1.3															
		01702	SD-11 Closeout Submittals																
			As-built Drawings	3.1.1	G RE														
		02100	SD-01 Preconstruction Submittals																
			Diversion and Control of Water Plan	1.2.1	G RE														
		02300	SD-01 Preconstruction Submittals																
			Testing Facilities	3.14.1.1	G RE														
			Excavation Plan	3.2	G RE														
			Excavation Plan	3.2.1	G RE														
			Haul Route Plan	3.11.1	G RE														
			Soil Stabilizer	2.2	G RE														
			SD-02 Shop Drawings																
			Shop Drawings	3.4	G RE														
			Explosive Storage Locations	3.3.8.2	G RE														
			Pre-construction topographic survey of the optional designated disposal site	3.11.2.1															

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F-4 BASIN AND CHANNEL

CONTRACTOR

A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION	P A R A G R A P H	C L A S S I F I C A T I O N R	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY			MAILED TO CONTR/	REMARKS			
						SUBMIT (g)	BY (h)	BY (i)	A C T I O N C O D E	DATE OF ACTION (k)		DATE RCD FROM CONTR (l)	DATE FWD TO OTHER REVIEWER (m)	DATE RCD FROM OTH REVIEWER (n)			A C T I O N C O D E	DATE OF ACTION (p)	DATE RCD FRM APPR AUTH (q)
		02300	Post-construction topographic survey of the optional designated disposal site	3.11.2.1															
			Pre-construction topographic survey of the entire project site, except optional designated disposal site	Part 3															
			Post-construction topographic survey of the entire project site, except optional designated disposal site	Part 3															
			SD-05 Design Data																
			Pre-Blast Data Report	3.3.2															
			Post-Blast Data Report	3.3.7															
			SD-06 Test Reports																
			Field Density Tests	3.14.2															
			Field Density Tests	3.14.2.2															
			Treating of Compacted Fill Materials	3.14.2.1															
			Record testing	3.14.2.3															
		02316	SD-01 Preconstruction Submittals																
			CLSM Mixture Proportioning	2.1.8															
			Testing Facilities	3.4.1	G RE														
			SD-06 Test Reports																
			Field Density Tests	3.4.3															
			Field Density Tests	3.4.3															

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TITLE AND LOCATION F-4 BASIN AND CHANNEL						CONTRACTOR											
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR	REMARKS	
						SUBMIT (g)	BY (h)	MATERIAL NEEDED (i)	A C T I O N C O D E (j)	DATE OF ACTION (k)	DATE RCD FROM CONTR (l)	DATE FWD TO APPR AUTH/ (m)	DATE RCD FROM OTH REVIEWER (n)	A C T I O N C O D E (o)			DATE OF ACTION (p)
		02316	Testing of Backfill Materials	3.4.2													
		02317	SD-11 Closeout Submittals														
			Satisfactory Installation	3.4													
		02500	SD-03 Product Data														
			Composition Requirements	2.1													
		02510	SD-03 Product Data														
			Installation	3.1													
			Waste Water Disposal Method	3.2													
			Satisfactory Installation	3.5													
			SD-06 Test Reports														
			Bacteriological Disinfection	3.3													
			Bacteriological Disinfection	3.3.1													
			Field Tests	3.7													
			SD-11 Closeout Submittals														
			Framed Instructions	3.7.3													
		02700	SD-02 Shop Drawings														
			Placing Pipe	3.3													
			SD-06 Test Reports														
			Pipeline Testing	3.8													
			SD-07 Certificates														
			Frame and Cover for Gratings	2.2.4													
		02709	SD-04 Samples														
			Filter Material	2.2													
		02722	SD-03 Product Data														
			Plant, Equipment, and Tools	1.6													
			Waybills and Delivery Tickets	3.3													

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F-4 BASIN AND CHANNEL

CONTRACTOR

A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							APPROVAL NEEDED	MATERIAL NEEDED	A C T I O N C O D E	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	A C T I O N C O D E	DATE OF ACTION		
(a)	(b)	(c)	ITEM SUBMITTED (d)	(e)	(f)	SUBMIT (g)	BY (h)	BY (i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02722	Waybills and Delivery Tickets	3.9													
			SD-06 Test Reports														
			Sampling and testing	1.4													
			Field Density Tests	1.4.2.4													
		02741	SD-01 Preconstruction Submittals														
			Quality Control Plan for hot-mix asphalt	3.9.1	G RE												
			SD-03 Product Data														
			Waybills and Delivery Tickets	3.6.1													
			Waybills and Delivery Tickets	3.10													
			SD-04 Samples														
			Asphalt Cement Binder	2.2													
			SD-05 Design Data														
			Bituminous Pavement Mix Design	2.3	G RE												
			Job Mix Formula	2.3.1	G RE												
			Properties of Bituminous Pavement Mixture	2.3.1	G RE												
			SD-06 Test Reports														
			Asphalt Content	3.9.3.1													
			Aggregate Gradation	3.9.3.2													
			Aggregate Moisture	3.9.3.3													
			Temperatures	3.9.3.4													
			Moisture Content of Mixture	3.9.3.5													
			Laboratory Air Voids, Marshall	3.9.3.6													
			Stability and Flow														
			In-place Density	3.9.3.7													

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A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION	P A R A G R A P H	C L A S S I F I C A T I O N R	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY			MAILED TO CONTR/	REMARKS	
						SUBMIT (g)	BY (h)	MATERIAL NEEDED (i)	A C T I O N C O D E (j)	DATE OF ACTION (k)		DATE RCD FROM CONTR (l)	DATE FWD TO OTHER REVIEWER (m)	DATE RCD FROM OTH REVIEWER (n)			A C T I O N C O D E (o)
		02741	Thickness	3.9.3.8													
			Grade Conformance and Surface Smoothness	3.9.3.9													
			Asphalt Cement Binder	2.2													
			Aggregates	2.1													
			QC Monitoring	3.9.3.11													
			SD-07 Certificates														
			Testing Laboratory	3.5	G RE												
			Certification of compliance	3.9.3.11													
			Plant Scale Calibration	1.4													
			Certification														
		02748	SD-06 Test Reports														
			Sampling and Testing	3.7													
			SD-07 Certificates														
			Waybills and Delivery Tickets	3.4													
		02821	SD-02 Shop Drawings														
			Post and Cable Railing System	3.10													
			Chain Link Metal Fence and Gates	3.3													
			SD-07 Certificates														
			Chain Link Fence	2.1.1													
		02910	SD-01 Preconstruction Submittals														
			Credentials and Past Project Experience Form of the Proposed Landscape Professional	Part 3	G RE												

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A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION	P A R A G R A P H	G O V T C L A S S I F I C A T I O N / R E V I E W I N G	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY			MAILED TO CONTR/	REMARKS	
						SUBMIT (g)	BY (h)	MATERIAL NEEDED (i)	A C T I O N C O D E	DATE OF A C T I O N (k)		DATE RCD FROM CONTR (l)	DATE FWD TO OTHER REVIEWER (m)	DATE RCD FROM OTH REVIEWER (n)			A C T I O N C O D E
(a)	(b)	(c)	ITEM SUBMITTED (d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02910	Credentials and Past Project Experience Form of the Proposed Landscape Professional Equipment	3.4	G RE												
			Fencing Materials	2.3													
			Temporary Irrigation Plan	2.2	G RE												
		02921	SD-01 Preconstruction Submittals														
			Equipment	3.1.3													
			Soil Stabilizer	2.4													
			Chemical Treatment Material	2.6													
			Seeding Equipment	3.1.3													
			Temporary Irrigation Plan	3.3.5.1	G RE												
			SD-07 Certificates														
			Availability of topsoil from the stripping and stock piling operations	2.2													
			Finished Grade and Topsoil Status	2.2													
			Finished Grade and Topsoil Status	3.2.1													
			Seed	2.1													
			Fertilizer	2.3.1													
			Pesticide	3.5													
			SD-06 Test Reports														
			Soil Sample Fertility Analyses Report	2.2.1.2	G RE												

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TITLE AND LOCATION F-4 BASIN AND CHANNEL						CONTRACTOR											
ACTIVITY NO	TRANSMITTAL NO	SPEC NO	DESCRIPTION	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY			MAILED TO CONTR/	REMARKS	
						SUBMIT (g)	BY (h)	BY (i)	ACTION (j)	DATE OF ACTION (k)		DATE RCD FROM CONTR (l)	DATE FWD TO OTHER REVIEWER (m)	DATE RCD FROM OTH REVIEWER (n)			ACTION (o)
		02921	Seeding Equipment Calibration	3.1.3	G RE												
			SD-11 Closeout Submittals														
			Bi-Monthly Plant Maintenance	3.8.3.4	G RE												
			Record														
		02930	SD-01 Preconstruction Submittals														
			Soil Stabilizer	2.4													
			Browse Control	2.8													
			Soil Amendments	1.5.1.4													
			SD-02 Shop Drawings														
			Temporary Irrigation Plan	3.1.3.3	G RE												
			SD-06 Test Reports														
			Soil Tests	2.2													
			Laboratory Analysis	2.2													
			Three On-site Percolation Tests	3.1.3.2													
			SD-07 Certificates														
			Plant Material	1.5.1.2													
			Plant Material	1.5.1.2													
			Fertilizer	2.3.1													
			Soil Stabilizer Properties	2.4.1													
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A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION	P A R A G R A P H	C L A S S I F I C A T I O N S I F I C A T I O N S I F I C A T I O N S	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY			MAILED TO CONTR/	REMARKS	
						SUBMIT (g)	BY (h)	MATERIAL NEEDED (i)	A C T I O N C O D E	DATE OF ACTION (k)		DATE RCD FROM CONTR (l)	DATE FWD TO OTHER REVIEWER (m)	DATE RCD FROM OTH REVIEWER (n)			A C T I O N C O D E
(a)	(b)	(c)	ITEM SUBMITTED (d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02930	Bi-Monthly Plant Maintenance Record	3.8.12.2	G RE												
			Maintenance Instructions	3.8.12.1	G RE												
		02950	SD-01 Preconstruction Submittals														
			Equipment	3.1													
			Simulated Desert Varnish	3.4													
		03101	SD-02 Shop Drawings														
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			SD-03 Product Data														
			Materials	2.1													
			SD-07 Certificates														
			Shop Drawings	3.1.1	G RE												
			Shop Drawings	3.1.1	G RE												
			Inspection	3.3													
			Formwork Not Supporting the Weight of Concrete	3.2.1	G RE												
		03151	SD-07 Certificates														
			Premolded Expansion Joint Filler Strips	2.1.1													
			Compression Seals and Lubricant	2.1.2.2													
			Field Molded Sealants and Primer	2.1.2.1													
		03200	SD-02 Shop Drawings														
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			SD-06 Test Reports														

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A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION	P A R A G R A P H	G O V T C L A S S I F I C A T I O N R	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY			MAILED TO CONTR/	REMARKS	
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(a)	(b)	(c)	ITEM SUBMITTED (d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		03200	Materials	2.1													
			Tests, Inspections, and Verifications	2.1.1													
		03301	SD-03 Product Data														
			Concrete Mixture Proportioning	2.2													
			Batch Plant	3.1.2													
			Capacity	3.1.1													
			Concrete Mixers	3.1.3													
			Conveying Equipment	3.1.4													
			Placing Equipment	3.1.1													
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			Testing Technicians	3.7.1													
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			Hot-Weather Placing	3.3.5	G RE												
			Finishing	3.4	G RE												
			SD-04 Samples														
			Aggregates	1.3.1.1													
			Cementitious Materials, Admixtures, and Curing Compound	1.3.1.2													
			SD-06 Test Reports														
			Quality of Aggregates	3.7.2.3													

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									A C T I O N C O D E	DATE OF ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	A C T I O N C O D E		
											SUBMIT (g)					BY (h)	BY (i)
(a)	(b)	(c)	ITEM SUBMITTED (d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		03301	Mixer Uniformity	3.7.2.13													
			Test Results and Inspection	3.7													
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			Chemical Admixtures	2.1.3													
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			aggregate stockpile	2.1.3													
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			Mixers	3.1.3													
			Transporting Equipment	3.1.4													
			Spreading Equipment	3.1.5													
			Compaction Equipment	3.1.6													
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			SD-02 Shop Drawings														
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			Soil Cement Production	3.3.1	G RE												
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SECTION 01355

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 - 1.2.2 Environmental Protection
 - 1.2.3 Contractor Generated Hazardous Waste
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SECTION 01355

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions of Waters of the United States
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
49 CFR 171 - 178	Hazardous Materials Regulations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(3 Nov 2003) U.S. Army Corps of Engineers Safety and Health Requirements Manual
WETLAND MANUAL	Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or

welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.5 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.6 Waters of the United States

Waters of the United States refers to all waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.7 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an

area is classified as a wetland must be done in accordance with WETLAND MANUAL.

1.3 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable Federal, State, and local environmental laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

1.5 PAYMENT

No separate payment will be made for work covered under this section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. All costs associated with this section shall be included in the contract price. The Contractor shall be responsible for payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G, RE.

The environmental protection plan.

Joint Condition Survey Report; G, RE.

A report on the joint condition survey.

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address

during construction. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan shall be current and maintained onsite by the Contractor. A single copy each of the initial and final Environmental Protection Plans shall be made available to the COE project Environmental Coordinator for review and comment and for future reference.

1.7.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.2 Contents

The environmental protection plan shall include, but shall not be limited to, the following:

- a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.
- b. Name(s) and qualifications of person(s) responsible for manifesting (including identification of) hazardous waste to be removed from the site, if applicable.
- c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
- d. Description of the Contractor's environmental protection personnel training program.
- e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A copy of the Contractor's Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.
- f. Drawings showing locations of proposed temporary excavations or

embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.

g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff. Plan shall also include but not be limited to inclusion of traffic rerouting requirements, requirements for speed limits and noise restrictions and timing restrictions for construction vehicles, and the requirements for traffic control personnel on public roads.

h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

i. Drawing showing the location of borrow areas.

j. The Spill Control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer and the local Fire Department in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

3. Training requirements for Contractor's personnel and methods of accomplishing the training.

4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

6. The methods and procedures to be used for expeditious contaminant cleanup.

k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction. The Contractor shall attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. The report shall be submitted on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and shall be for the previous quarter (e.g. the first working day of January, April, July, and October). The report shall indicate the total amount of waste generated and total amount of waste diverted in cubic meters or tons along with the percent that was diverted.

l. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site. This air pollution control plan shall also include any measures and practices that will be implemented to maintain engine exhaust emissions in compliance with state and federal thresholds.

n. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated.

o. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan shall include a sketch showing the location for land application along with a description of the

pretreatment methods to be implemented. If surface discharge will be the method of disposal, a copy of the permit and associated documents shall be included as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

p. A historical, archaeological, cultural resources, biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. The plan shall include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.

1.7.3 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached, as an appendix, to the Environmental Protection Plan.

1.8 PROTECTION OF FEATURES

This paragraph supplements the Contract Clause (FAR 52.236-9 in Section 00700) PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, the Contractor and the Contracting Officer shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief joint condition survey report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report shall be signed by both the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor shall protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.9 SPECIAL ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with the special environmental requirements listed here and included in Table 01355-1 at the end of this section.

1.10 ENVIRONMENTAL REVIEW AND APPROVAL OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to

approval by the Contracting Officer and may require additional Government review and approval time for an extended review, additional processing, additional documentation, at no additional cost to the Government. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

This paragraph supplements the Contractor's responsibility under the contract clause "PERMITS AND RESPONSIBILITIES" to the extent that the Government has obtained environmental permits. The Contractor shall comply with the terms and conditions of the attached list of environmental commitments in Table 01355-1 at the end of this section.

The Contractor shall be responsible for obtaining and complying with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations.

3.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

3.2.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs) as specified in Section 01356 STORM WATER POLLUTION PREVENTION MEASURES. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. The Contractor's best management practices shall also be in accordance with the National Pollutant Discharge Elimination System (NPDES) and Storm Water Pollution Prevention Plan (SWPPP) which may be reviewed at the Contractors Project Office. Any temporary measures shall be removed after the area has been stabilized.

3.2.3.1 Unprotected Erodible Soils

Earthwork brought to final grade shall be finished as indicated. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in cases where the constructed feature obscures borrow areas, quarries, and waste material areas, these areas shall not initially be totally cleared. Clearing of such areas shall progress in reasonably sized increments as needed to use the developed areas as approved by the Contracting Officer.

3.2.3.2 Disturbed Areas

The Contractor shall effectively prevent erosion and control sedimentation through approved methods including, but not limited to, the following:

- a. Retardation and control of runoff. Runoff from the construction site or from storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, berms, and by any measures required by area wide plans under the Clean Water Act.

3.2.4 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Erosion and sediment controls shall be provided for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas.

3.3 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.3.1 Cofferdams, Diversions, and Dewatering Operations

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure shall be controlled at all times to maintain compliance with existing State water quality standards and designated uses of the surface water body. The Contractor shall comply with the State of Nevada water quality standards and anti-degradation provisions.

3.3.2 Stream Crossings

Stream crossings shall allow movement of materials or equipment without violating water pollution control standards of the Federal, State, and local governments.

3.3.3 Wetlands

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands.

3.4 AIR RESOURCES

Equipment operation and activities or processes performed by the Contractor in accomplishing the specified construction shall be in accordance with the

State's rules and all Federal emission and performance laws and standards. The Contractor shall obtain and comply with Air Quality Permits. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained. Monitoring of air quality shall be the Contractor's responsibility. All air areas affected by the construction activities shall be monitored by the Contractor. Monitoring results will be periodically reviewed by the Government to ensure compliance.

Special management techniques as set out below shall be implemented to control air pollution by the construction activities. These techniques supplement the requirements of Federal, State, and local laws and regulations; and the safety requirements under this Contract. If any of the following techniques conflict with the requirements of Federal, State, or local laws or regulations, or safety requirements under this contract, then those requirements shall be followed in lieu of the following.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations. **See also Section 01200 paragraph "NO DUST PALLIATIVE/SOIL STABILIZER MIXED IN WITH F-4 DEBRIS BASIN EMBANKMENT COMPACTED FILL MATERIALS OR IN CHANNEL AND ROAD COMPACTED BACKFILL MATERIALS" for additional information.**

3.4.1.1 Other Air Pollutants

All construction equipment and trucks shall have their engines kept in a state of tune that will minimize all exhaust pollutants, and shall use fuel of a quality that does not produce excessive amounts of exhaust plumes. Methods to reduce NOX levels may include the following measures:

- a. Require injection timing retard of 2 degrees on all diesel vehicles where applicable.
- b. Install high-pressure injectors on all vehicles, where feasible.
- c. Use Caterpillar pre-chamber diesel engines or equivalent, and perform proper maintenance and operation.

- d. Electrify equipment, where feasible.
- e. Maintain equipment in tune with manufacturers' specifications, except as otherwise stated above.
- f. Restrict the drilling of construction equipment to 10 minutes.
- g. Install catalytic converters on gasoline-powered equipment.
- h. Substitute gasoline-powered for diesel-powered equipment, where feasible.

3.4.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.4.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the State of Nevada rules and to Clark County rules and/or ordinances.

3.4.4 Burning

Burning will not be allowed on the project site unless specified in other sections of the specifications or authorized in writing by the Contracting Officer. The specific time, location, and manner of burning shall be subject to approval.

3.5 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.5.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill shall be the minimum acceptable off-site solid waste disposal option. The Contractor shall verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. The Contractor shall comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.5.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 150 mm of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.5.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. The Contractor shall, at a minimum, manage and store hazardous waste in compliance with 40 CFR 262. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations.

The Contractor shall transport Contractor generated hazardous waste off Government property within 15 calendar days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility.

3.5.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. Storage of fuel on the project site shall be accordance with all Federal, State, and local laws and regulations.

3.5.5 Waste Water

Disposal of waste water shall be as specified below.

- a. Waste water from construction activities, such as on-site material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to

enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related waste water off-Government property in accordance with all Federal, State, Regional and Local laws and regulations.

- b. For discharge of ground water, the Contractor shall surface discharge in accordance with the requirements of the NPDES or State STORM WATER DISCHARGES FROM CONSTRUCTION SITES permit.
- c. Water generated from the flushing of lines after disinfection, or disinfection in conjunction with hydrostatic testing, shall be discharged into the sanitary sewer only with prior approval and/or notification to the Waste Water Treatment Plant's Operator.

3.6 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project.

3.7 NON-HAZARDOUS SOLID WASTE DIVERSION REPORT

The Contractor shall maintain an inventory of non-hazardous solid waste diversion and disposal of construction and demolition debris. The Contractor shall submit a report to the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that non-hazardous solid waste has been generated. The following shall be included in the report:

- a. Construction and Demolition (C&D) Debris Disposed = _____ in cubic meters, as appropriate.
- b. Construction and Demolition (C&D) Debris Recycled = _____ in cubic meters, as appropriate.
- c. Total C&D Debris Generated = _____ in cubic meters, as appropriate.
- d. Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) = _____ in cubic meters, as appropriate.

3.8 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made

as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.9 BIOLOGICAL RESOURCES

3.9.1 Threatened and Endangered Species Protection

The Contractor shall strictly adhere to the relevant articles of Table 01355-1 found at the end of this section.

If during construction activities any threatened or endangered species (particularly the Desert Tortoise) are observed in or near the construction area, such observations shall be reported immediately to the Contracting Officer so that the appropriate authorities may be notified and a determination made as to what special disposition should be made. In no circumstances shall any employee directly handle any tortoise unless it is in imminent danger. The Contractor shall cease all activities that may result in an impact to or the destruction of these resources. The Contractor shall prevent his employees from trespassing on private property, removing, or otherwise disturbing any threatened or endangered species. The Contractor shall not interfere with the desert tortoise monitor's authorized activities except for safety reasons.

Based on the Nevada Division of Wildlife's (NDOW) February 23, 2001 comments on the January 2001 DSEA (Draft Supplemental Environment Assessment) for another project (specifically the R-4 Detention Basin and Haul Road Alignment), the Corps has agreed to incorporate protocols to protect the Gila monster into its program to protect the desert tortoise in future projects such as this F-4 Basin and Channel project and Blue Diamond Detention Basin Landscaping and Flamingo Detention Basin Landscaping project. Separate surveys for the Gila monster are not required. The biological monitor (for the desert tortoise) shall also be trained to recognize the Gila monster and to handle this species according to NDOW protocol. The Gila monster is not federally listed as Threatened or Endangered, but it is classified as a State of Nevada Protected Reptile and a BLM Sensitive Species. If during the preconstruction biological surveys or construction monitoring (for desert tortoise), a Gila monster is discovered, the NDOW will be notified. If the NDOW is not available, the biologist shall photograph the Gila monster, document its location, capture, and release the Gila monster out of harm's way, using precautions to avoid being bitten.

3.9.2 Protection of Biological Resources

The Contractor shall keep construction activities under surveillance, management, and control to minimize interference with, disturbance to, and damage of, native vegetation, fish, and wildlife. The Contractor shall minimize interference with, disturbance to, and damage of wildlife and plants including their habitat. Species that require specific attention along with measures for their protection shall be listed by the Contractor prior to beginning of construction operations. The Contractor shall be

responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.10 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. The Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

3.11 MAINTENANCE OF POLLUTION CONTROL FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.12 MILITARY MUNITIONS

In the event the Contractor discovers or uncovers military munitions as defined in 40 CFR 260, the Contractor shall immediately stop work in that area and immediately inform the Contracting Officer.

3.13 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area. The Contractor's personnel shall also be trained and become familiarized with the commitments in Table 01355-1 at the end of this section and shall provide cooperation with the Desert Tortoise Monitor.

3.14 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

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SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 3740 (2001) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (2002) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The project manager will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The project manager in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The project manager shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall

be responsible for all construction and construction related activities at the site.

3.2 QUALITY CONTROL PLAN

The Contractor shall furnish for review by the Government, not later than 10 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.
- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 10 calendar days prior to the Coordination Meeting.

During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the

Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. The Safety and Health Manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, show drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 5 years construction experience on construction similar to this contract. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager. **The Contractor shall include a separate full time quality control manager for work at the F-4 Debris Basin and at the Channel areas (two each). The use of the alternate quality control system manager for one of these two areas shall be acceptable and may also satisfy the requirements to fulfill the quality control system manager for the other area during short durations of absences as approved by the Contracting Officer.**

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: civil, structural, materials technician. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of

responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

Experience Matrix

	Area	Qualifications
a.	Civil	Graduate Civil Engineer with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience
b.	Structural	Graduate Structural Engineer with 2 yrs experience or person with 5 yrs related experience
c.	Concrete, Pavements and Soils	Materials Technician with 2 yrs experience for the appropriate area

3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors".

3.4.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.
- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers certified testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$2,500.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to state-licensed laboratory, approved by the Contracting Officer's Representative.

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Special Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected.

Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from major commands, as well as the local sponsors may also be in

attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- g. Offsite surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered;

and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 12 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

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SECTION 01702

AS-BUILT DRAWINGS

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

As-built Drawings; G, RE.

Red-line marked up blue-line drawings.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 AS-BUILT FIELD DATA

3.1.1 General

The Contractor shall prepare and furnish the as-built drawings for the project. The as-built drawings shall be a record of the construction as installed and completed by the Contractor. They shall include all the information shown on the contract set of drawings and a record of all deviations, modifications, or changes from those drawings, however minor, which were incorporated in the work, all additional work not appearing on the contract drawings, and all changes which are made after final inspection of the contract work. In event the Contractor accomplishes additional work which changes the as-built conditions of the facility after submission of the as-built drawings, the Contractor shall furnish revised and/or additional drawings as required to depict as-built conditions. The requirements for these additional drawings will be the same as for the asbuilt drawings included in the original submission. The drawings shall show the following information, but not be limited thereto:

(a) The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.

(b) The location and dimensions of any changes within the building or structures.

- (c) Correct grade or alignment of roads, channels, structures or utilities if any changes were made from contract plans.
- (d) Correct elevations if changes were made in site grading.
- (e) Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, dimensions of equipment foundations, etc.
- (f) The topography and grades of all drainage installed or affected as a part of the project construction.
- (g) All changes or modifications which result from the final inspection.
- (h) Where contract drawings or specifications allow options, only the option actually used in the construction shall be shown on the as-built drawings. The option not used shall be deleted.

3.1.2 Preliminary As-Built Drawings

The Contractor shall maintain one (1) set of full size, blue-line prints marked up in red to show the as-built conditions. This set of as-built prints shall be kept current and available at the job site at all times. All changes from what is shown on the contract plans, whether it be from changes requested by the Contracting Officer or resulting from additional information which might be uncovered in the course of construction, shall be accurately and neatly recorded as they occur by means of details and notes. The marked-up as-built prints will be jointly inspected for accuracy and completeness by the Contracting Officer and Contractor prior to submission of each monthly pay estimate. Failure to keep the As-Built Field Data current shall be sufficient justification to withhold a retained percentage from the monthly pay estimate. Information to be included on these preliminary drawings shall conform to the requirements as stated above. Any and all as-built modifications shall be reflected on all sheets affected by the modifications.

3.1.2.1 Submittal of the As-Built Field Data

One (1) full size set of marked up drawings with the as-built field data shall be submitted to the Contracting Officer for review and approval a minimum of 20 calendar days prior to the date of final inspection. If review of the preliminary as-built drawings reveals errors and/or omissions, the drawings will be returned to the Contractor for corrections. The Contractor shall make all corrections and return the drawings to the Contracting Officer within 10 calendar days of receipt.

3.2 AS-BUILT ELECTRONIC FILE DRAWINGS

3.2.1 General

No later than 30 days after final acceptance a complete set of as-built

drawings shall be submitted in Bentley MicroStation file format (DGN files). The as-built drawings shall be done in a quality equal to that of the originals. Line work, line weights, and lettering, and use of symbols shall be the same as the original line work, line weights, and lettering, and symbols. If additional drawings are required they shall be prepared in electronic file format under the same guidance. When final revisions have been completed, each drawings shall be identified with the words "ASBUILT" in blockletters at least 3/8-inch high placed above the title block if space permits, or if not, below the title block between the border and the trim line. The date of completion and the words "REVISED AS-BUILT" shall be placed in the revision block above the latest revision notation.

3.2.2 Original Files

Upon Contractor's request the Government will provide the Contractor one set of Bentley MicroStation electronic file format (DGN Files) contract drawings of the T, C, DB, S, M, G, and L sheets to be used for asbuilt drawings. The electronic file drawings will be available on CD-ROM media.

Upon Contractor's request the Government will provide the Contractor one set of AutoCADD electronic file format (DWG Files) contract drawings of the DT, and D sheets to be used for asbuilt drawings. The electronic file drawings will be available on CD-ROM media.

3.2.3 Electronic File Submittal Requirements

3.2.3.1 File Submittals

The MicroStation electronic file(s) deliverable shall be in MicroStation version J 'DGN' binary format. All support files required to display or plot the file(s) in the same manner as they were developed shall be delivered along with the files. These files include but are not limited to Font Libraries, Pen Tables, and Referenced files.

3.2.3.2 Drawing Format

Layering shall be performed in accordance with EM Standards Manual for U.S. Army Corps of Engineers Computer-Aided Design and Drafting (CADD) Systems. An explanatory list of which layer is used at which drawing and an explanatory list of all layers which do not conform to the guidelines shall be provided with each submittal.

3.2.3.3 Electronic File Deliverable Media

All electronic files shall be submitted on CD-ROM media. Two complete sets of disks shall be submitted along with one complete set of prints taken from the disks. Each disk shall be clearly marked with type written self adhesive disk labels which shall contain the following information: Contractor's firm name, project name and location, submittal type (ASBUILT), the name of each file contained within the disk or archive file, the format and version/release number of each file, a disk number indicating the numeric sequence of the disk in the submittal along with the total number of disks in the submittal, and date the disk was made. Due to the limited ability to mark on CD-ROM media, only the Contractor's firm

name, project name and location, submittal type (AS-BUILT) and date will be required. Each submittal shall be accompanied by a hard copy transmittal sheet that contains the above information along with a description of each file provided in the submittal.

3.3 FINAL AS-BUILT DRAWINGS

The final as-built record drawings shall be completed and returned together with the approved preliminary as-built drawings to the Contracting Officer within 30 calendar days of final acceptance. The Contracting Officer will review all final as-built record drawings for accuracy and conformance to the drafting standards and other requirements contained in Section 01200 GENERAL REQUIREMENTS. The drawings shall be returned to the Contractor if corrections are necessary. The Contractor shall make all corrections and shall return the drawings to the Contracting Officer within 5 calendar days of receipt. Upon final approval, the Contractor shall furnish two (2) full size sets and two (2) half size sets of the final as-built plans on reproducible mylars, and the electronic as-built project files. All project files, whether revised or not, shall be provided to the Contracting Officer.

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SECTION 02230

CLEAR SITE AND REMOVE OBSTRUCTIONS

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and including the removal of debris piles (consisting of construction debris and/or dumped soils, dumped gravels, dumped rocks and dumped boulders), and rubbish and/or trash and vehicle debris (vehicle bodies and/or vehicle parts) occurring in the areas to be cleared. In specified bid item, clearing shall also include removal and disposal of existing chain link fence at beltway RCB. In specified bid items, clearing shall also include removal and disposal of existing riprap and shall include removal of any existing filter fabric under riprap. In specified bid item, clearing shall also include sawcutting and removal of necessary portions of the existing precast RCB structure and/or existing RCP structure to allow for placement of new channel and side drain structure.

1.1.2 Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 75 mm in diameter, and matted roots from the designated grubbing areas.

1.2 SUBMITTALS (NOT APPLICABLE)

1.3 ENVIRONMENTAL PROTECTION

All work and Contractor operations shall comply with the requirements of Section 01355 ENVIRONMENTAL PROTECTION and Section 02300 EARTHWORK.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 REQUIREMENTS

3.1.1 General

Except as otherwise specified, and/or indicated, areas to be cleared will

be limited to actual excavation areas, and areas on which fills and/or structures are to be placed. The removal of trees, shrubs, turf, and other vegetation outside of these areas shall be held to a minimum and care shall be exercised not to damage any trees, shrubs, turf, or vegetation which can be left in place.

3.1.2 Existing Structures and Obstructions

The Contractor shall clear and grub areas of fill and excavation, and remove and dispose of existing structures and obstructions necessary for project construction, except for those structures which are identified to be protected in place as shown on the drawings.

3.2 CLEARING

All rubbish, waste dumps, and debris areas shall be cleared. Vegetation including grasses, shrubs and weeds shall be removed by grading the existing ground surface to a depth of 0.15 meters, except such vegetation as may be indicated or directed to be left standing. Vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

3.3 GRUBBING

Grubbing shall consist of removing non-salvaged roots larger than 75 mm in diameter, matted roots, and other objectionable vegetable matter in the required fill areas, foundation areas, and all excavation areas. In grubbing roots, 610 mm diameter roots shall be removed to below the depth of the required excavation or existing ground level, whichever is lower. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.4 Trash and Construction Debris

Surface trash and construction debris may be present at the project site. Surface trash and construction debris shall be removed from within the limits of the right-of-way and temporary construction easements. This includes the removal of debris piles (consisting of construction debris, minor construction equipment abandoned, and/or dumped soils, dumped gravels, dumped rocks and dumped boulders), and rubbish and/or trash and/or vehicle debris (vehicle bodies and/or vehicle parts) and/or appliance debris (whole or parts) occurring in the areas to be cleared.

3.5 Environmental Assessment Requirement

The Contractor shall notify the Contracting Officer 14 calendar days prior to the start of clearing and grubbing activities in accordance with Section 01200 GENERAL REQUIREMENTS, Paragraph ENVIRONMENTAL ASSESSMENT REQUIREMENT.

3.6 DISPOSAL OF GRUBBED AND REMOVED MATERIAL

Trash, construction debris, debris piles, rubbish, vehicle debris, appliance debris and material from grubbing, that is designated as scrap, shall become the property of the Contractor, and shall be removed from the site. Scrap and unsatisfactory soils and materials and unstable soils and materials as described in Section 02300 EARTHWORK, paragraph DISPOSITION AND DISPOSAL OF EXCAVATED MATERIALS, shall become the property of the Contractor, and shall be removed from the site. Disposal shall be in accordance with the requirements of Section 01355 ENVIRONMENTAL PROTECTION.

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SECTION 02300

EARTHWORK

PART 1 GENERAL

BLM Land area locations and boundaries are shown on the T sheets.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE EM 385-1-1 (3 Nov 2003) Safety and Health
Requirements Manual

ASTM INTERNATIONAL (ASTM)

ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D 2487	(2000) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996el) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(2001) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4914	(1994) Density of Soil and Rock in Place by the Sand Replacement Method in a Test Pit.
ASTM D 5030	(1994) Density of Soil and Rock in

Place by the Water Replacement Method in a Test Pit.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Testing Facilities; G, RE.

The testing facilities shall be validated in conformance with paragraph TESTING FACILITIES

Excavation Plan; G, RE.

The Contractor shall submit his excavation plan to the Contracting Officer in conformance with paragraph EXCAVATION PLAN

Haul Route Plan; G, RE.

The Contractor shall submit a haul route plan for removal of required excavated materials and for placing required fill materials.

Soil Stabilizer; G, RE.

Manufacturer's literature including physical characteristics, application and installation instructions for equipment, and soil stabilizer material.

SD-02 Shop Drawings

Shop Drawings; G, RE.

The contractor shall submit for approval shop drawings showing the proposed method of bracing which he intends to use to protect existing property.

Explosive Storage Locations; G, RE.

The contractor shall submit to the Contracting Officer drawings showing the location, access to and type of construction of the proposed storage magazine for explosives, and cap house.

Pre-construction topographic survey of the optional designated disposal site

The contractor shall submit to the Contracting Officer pre-construction surveys of the optional designated disposal site shown on the drawings.

Post-construction topographic survey of the optional designated disposal site

The contractor shall submit to the Contracting Officer post-construction surveys of the optional designated disposal site for each of the compacted fill work and the stockpiled filled work shown on the drawings.

Pre-construction topographic survey of the entire project site, except optional designated disposal site.

The contractor shall submit to the Contracting Officer pre-construction surveys of the entire project site as shown on the drawings, except for the optional designated disposal site. The Contractor, at his own choosing, may perform the pre-construction surveys of the sites not less than one week prior to earthwork activities of that site.

Post-construction topographic survey of the entire project site, except optional designated disposal site.

The contractor shall submit to the Contracting Officer post-construction surveys of the entire project site as shown on the drawings, including post-construction surveys for each of the compacted fill work and the stockpiled filled work and the graded fill work, except for the optional designated disposal site.

SD-05 Design Data

Pre-Blast Data Report.

Post-Blast Data Report.

The Contractor shall submit Pre- and Post-Blast Reports which shall contain all of the pertinent data on the location by station, ground surface elevation in the area of the blast; diameter, spacing, depth, over-depth, pattern and inclination of blast holes; the type, strength, amount, distribution and powder factor for the explosives to be used and actually used per hole and per blast; the sequence and pattern of delays, and description and purpose of special methods.

SD-06 Test Reports

Field Density Tests.

Treating of Compacted Fill Materials.

Record testing

Copies of all laboratory and field test reports shall be submitted to the Contracting Officer on approved forms within 24 hours of the completion of the tests.

1.3 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum

density obtained by the test procedure presented in ASTM D 1557.

1.4 DEFINITION OF SATISFACTORY MATERIALS

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC and CL.

1.5 DEFINITION OF UNSATISFACTORY MATERIALS

NOTE - The term unsatisfactory materials and unsatisfactory soils are meant to be the same in this specification.

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also include but are not limited to those materials classified by ASTM D 2487 as CH, PT, OH, MH, ML, CL-ML, and OL and satisfactory material which contains root and other organic matter, and materials too wet (unstable) to support construction equipment. The Contracting Officer shall be notified of any contaminated materials.

1.6 MISCELLANEOUS FILL, LANDSCAPE FILL, AND STONE/CALICHE

The Contractor shall handle BLM Lands material and non-BLM Lands material in accordance with paragraph BLM LANDS MATERIAL AND ALL OTHER LANDS MATERIAL.

1.6.1 MISCELLANEOUS FILL

Miscellaneous fill shall consist of material from the required excavation, including surface soil from stripping that is in excess of topsoil material needed for areas of revegetation treatments. Miscellaneous fill shall be placed in the lines and grades indicated on the drawings and shall be placed with suitable equipment in successive horizontal layers over the entire plane of the work surface and which shall not exceed 600 millimeters in depth before consolidation. **Material, including rock, cemented alluvium, BLM topsoil not being reused, from the excavations of this project that would normally be disposed of by the Contractor, may be utilized and buried as miscellaneous fill provided such material does not exceed 600 millimeters in its greatest dimension, is placed in a manner that will prevent the formation of voids, and contain no nests of gravels, cobbles, or boulders, and is placed not less than 300 millimeters below finished grade (including finished grade of side slopes). No depressions in which water might pond shall be left in miscellaneous fill area. The finished areas shall be sloped to drain. Compaction other than that obtained by the controlled movement of the construction equipment will not be required. Contractor shall not place BLM material in the miscellaneous fill areas that are depicted within Grading Easements (GE) that are adjacent to the F-4 Channel on sheet T8 and the F-4 Channel and F-3 Channel and 5th Cell Structure on sheet T11 and T12.**

1.6.2 LANDSCAPE FILL

Landscape fill shall consist of material from the required excavation,

including surface soil from stripping that is in excess of topsoil material needed for areas of revegetation treatments. Landscape fill shall be placed in the lines and grades indicated on the drawings and shall be placed with suitable equipment in successive horizontal layers over the entire plane of the work surface and which shall not exceed 600 millimeters in depth before consolidation. Landscape fill materials shall not consist of rock or cobbles with dimensions greater than 50 mm in its greatest dimension, and shall not consist of cemented alluvium, but may consist of BLM topsoil not being reused. **Landscape fill material so defined shall be utilized as landscape fill provided such material is placed in a manner that will prevent the formation of voids, and is placed not less than below finished grade (including finished grade of side slopes). No depressions in which water might pond shall be left in landscape fill area.** The finished areas shall be sloped to drain. Compaction other than that obtained by the controlled movement of the construction equipment will not be required. Contractor shall not place BLM material in the miscellaneous fill areas that are depicted within Grading Easements (GE) that are adjacent to the F-4 Channel on sheet T8 and the F-4 Channel and F-3 Channel and 5th Cell Structure on sheet T11 and T12.

1.6.3 STONE/CALICHE

Stone/Caliche shall consist of material from the required excavation. Stone/Caliche shall be placed in the lines and grades indicated on the drawings and shall be placed with suitable equipment in successive horizontal layers over the entire plane of the work surface and which shall not exceed 600 millimeters in depth before consolidation. Material, consisting of rock and cemented alluvium from the excavations on BLM Lands of this project, may be utilized provided such material does not exceed 600 millimeters in its greatest dimension, has between 40 and 100 percent passing 300 millimeters, has between 30 and 70 percent passing 150 millimeters, and not more than 15 percent passing 75 millimeters. Compaction will not be required.

PART 2 PRODUCTS

2.1 PRE-EMERGENT HERBICIDE PRODUCT

Soil surfaces requiring treatment with pre-emergent herbicide shall be treated with a mixture of SURFLAN herbicide or approved equal applied at 0.16 liters per hectare and GALLERY herbicide or approved equal applied at 0.01 liters per hectare.

2.2 PIGMENTED DUST PALLIATIVE/SOIL STABILIZER PRODUCT

Soil stabilizer shall be a mixture of plaster and natural cellulose fiber mulch. The plaster cellulose fiber mulch stabilizer shall be Plas-Tex(tm) Soil Stabilizer as formulated by Soil-Tech Co., 5375 Cameron Dr., Las Vegas, NV 89118 (702) 873-2023) or approved equal. Proposed substitutions must be submitted to the Contracting Officer for review and approval.

2.2.1 Dust Palliative/Soil Stabilizer Properties

The plaster shall consist of naturally occurring high purity gypsum and

necessary additives, such as retarders and accelerators and water to formulate a binder that will produce a protective crust-like barrier within 4 to 8 hours after application.

The gypsum shall be produced from a quarried or mined source. In addition, the processed gypsum shall be composed of a crushed dry calcium sulfate hemihydrate (CA S04 1/2H2O) having a purity of not less than 88 percent. The processed gypsum plus necessary additives shall be furnished either in bags or bulk and be accompanied by certificates stating the gypsum's purity content, dry weight and source of manufacture. Processed gypsum, which has become partially air set, lumpy or caked, shall not be used.

The cellulose fiber mulch shall be produced from grinding clean, whole wood chips. The wood chips shall be thermally dehydrated to produce a high quality blend of fibers, dyed with a non-toxic vegetable based dye to aid in visual metering during application. The moisture content shall average 12 percent.

A color pigment shall be added to the slurry at the time of application. The pigment color shall be selected to blend with the existing site colors. Sample test plots of the proposed pigment color(s) shall be tested at the project site and approved by the Contracting Officer prior to application on the specified areas.

2.2.2 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

PART 3 EXECUTION

Prior to the start of construction work (including clear site and remove obstructions, the Contractor shall conduct a **Pre-construction topographic survey of the entire project site, except optional designated disposal site** in accordance with Section 01200 GENERAL REQUIREMENTS paragraph CONTRACTOR'S SURVEYS.

At the end of all work associated with this section, the Contractor shall conduct a **Post-construction topographic survey of the entire project site, except optional designated disposal site** in accordance with Section 01200 GENERAL REQUIREMENTS paragraph CONTRACTOR'S SURVEYS.

3.1 STRIPPING

Stripping consists of removing loose (not requiring blasting or ripping) surface soils approximately 300 millimeters deep from the areas of basin excavation and embankment, after plant salvage operations in accordance with Section 02910 NATIVE PLANT EXTRACTION, SALVAGE AND STORAGE. Stripping operations shall include clearing of grasses, weeds, and non-salvaged shrubs. Surface soils shall be stockpiled for use as topsoil in areas of revegetation treatment or as miscellaneous fill on the downstream side of the dam embankment.

3.2 EXCAVATION, GENERAL

Excavation shall consist of the removal of every type of material encountered in the designated areas or from areas directed. The material to be removed may include but is not limited to hardpan, silt, sand, gravel, cobbles and boulders, cemented silt/sand/gravel/cobbles/boulders with various degrees of cementation, caliche, limestone bedrock, asphalt, vegetation, trash, and other debris. Slope lines indicated on the drawings for temporary cuts do not necessarily represent the actual slopes to which the excavation must be made to safely perform the work. Unforeseen conditions may dictate that the temporary cut slope shall be made to the actual slope to which the work can be safely performed. Unless otherwise specified in other bid items, the Contractor will be responsible at his own cost for the temporary retaining of soil, including the alternate use of shoring and/or other techniques the Contractor determines, with approval from the Contracting Officer. Measurement and payment for excavation will be made in accordance with Section 01270. Excavation for permanent cuts shall be made to the slope lines indicated. Excavation will likely require ripping or other rock-excavation techniques, which may include blasting, and shall be performed in a manner which will not impair the subgrade. Use of heavy tractors equipped with a ripper tooth, hoe-rams, and hydraulic or pneumatic rock breaker could be necessary to excavate highly cemented soils. Rock or cemented material from required excavation to be used in compacted fills and backfills shall be crushed or otherwise reduced in size to meet gradation requirements prior to placement or stockpiling. **Except as otherwise specified, the finish surface of subgrades shall be smooth and shall not vary more than 25 mm from indicated grade when tested with a 1.5 m straightedge applied both parallel and at right angles to the centerline of the area, except at areas to receive concrete where finished surfaces of subgrade shall not vary more than 12.5 mm from indicated grade when tested with the same straightedge.** Excess excavated materials shall be hauled and stockpiled in the **optional** disposal site per the lines and grades shown on the drawings. Excess excavated materials including rocks and cemented soils shall be processed/crushed or otherwise reduced in sizes not exceeding 75 mm, prior to hauling and placing in the **optional** disposal site. Prior to commencing excavation, the Contractor shall submit his Excavation Plan to the Contracting Officer. All subgrade excavations will be inspected by the Contracting Officer prior to placement of any fill materials.

3.2.1 Excavation Plan

Prior to commencing excavation, the Contractor shall submit his plan for excavation to the Contracting Officer for acceptance. The plan must show all proposed locations of excavation operations utilizing methods involving blasting, headache balling, hoe ramming, or other techniques as may be applicable. In addition, the plan must include the results of a pre-excavation survey, a detailed blasting plan (if applicable) performed by a certified blasting consultant, and a seismic monitoring plan. The excavation plan shall be updated and resubmitted to the Contracting Officer any time the Contractor proposes altering his methods. The Contractor's methods for excavation are solely his responsibility. Approval of the excavation plan by the Contracting Officer will in no way limit the

Contractor's liability regarding property damaged by this operations, nor will it alter the Contractor's sole responsibility for the safety of his operations. The Contractor shall be responsible for all damage caused by his excavation operations and be responsible for answering all complaints. The Contractor shall provide the Contracting Officer with 30 days advance warning of the use of excavation techniques which may lead to property damage to allow for review of the proposed techniques, to confirm general compliance with these specifications, and to allow monitoring of the excavations methods.

- A. No subsurface investigation has been conducted by the Corps of Engineers of the the F-3 Channel alignment. No subsurface investigation has been conducted by the Corps of Engineers of the 5th Cell alignment. These areas are considered to be comprised of highly cemented materials and the Contractor shall be required to utilize blasting or other rock excavation techniques throughout. Oversized rock or cemented materials from the excavation shall be crushed or otherwise processed to meet compacted fill gradation requirements for new channel backfill, detour road embankments and debris basin embankments and grading, and the restoration of the borrow site area.

3.2.2 STRIPPING, BLM LAND ONLY

Stripping consists of removing loose (not requiring blasting or ripping) surface soils approximately 305 millimeters deep from the areas of intended channel excavation, basin excavation and embankment footprint, after plant salvage operations in accordance with Section 02910 NATIVE PLANT EXTRACTION, SALVAGE AND STORAGE, on BLM land only. Stripping operations shall include clearing of remaining grasses, weeds, and non-salvaged shrubs. **Surface soils so stripped shall be stockpiled, within BLM land ROW and TCE limits, for use as topsoil in areas of revegetation treatment or as miscellaneous fill on the downstream side of the embankment, on BLM land only. Stripped soils from heavily traveled areas by vehicles shall not be used as miscellaneous fill or landscape fill.**

3.2.3 BLM LANDS MATERIAL AND ALL OTHER LANDS MATERIAL

All excavated materials from BLM Lands will remain on BLM Lands and will be used on BLM lands as compacted fill or miscellaneous fill. Striped topsoil will also remain on BLM Lands. The Contractor shall not place BLM material in the Grading Easement fill areas that are depicted within Grading Easements (GE) that are adjacent to the F-4 Channel on sheet T8 and the F-4 Channel and F-3 Channel and 5th Cell Structure on sheet T11 and T12. Trash and debris shall be handled in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS.

Excavated materials from All Other Lands or from other sites will not be transported, temporarily or permanently, onto BLM Lands, nor utilized as compacted fill or miscellaneous fill for any portion of the project that is on BLM lands.

3.2.4 Excess Excavated Material on All Other Property

3.2.4.1 Satisfactory Materials

Satisfactory excavated material originating from the construction of the F-4 Channel from non-BLM Lands, except as noted in Section 01200 paragraph DISPOSAL OF EXCESS EXCAVATED MATERIAL, and not utilized in this project as fill material (fills, backfills, compacted fills) for channels, embankments, and roadways (such as Fort Apache Road), shall be classified as satisfactory excess excavated materials and shall become the property of the Contractor. The Contractor is allowed to dispose of the satisfactory excess excavated material from non-BLM Lands of this project as follows: off site at no additional cost to the Government **or at the optional designated disposal site in accordance with paragraph "Optional Designated Disposal Site" at no additional cost to the Government.**

3.2.4.2 Unsatisfactory Materials

See paragraph DEFINITION OF UNSATISFACTORY MATERIALS for definition of unsatisfactory material. Unsatisfactory materials shall become the property of the Contractor and shall be removed from the project site.

3.2.5 Haul Routes

The Contractor is advised that the roads, streets and highways intersecting through and adjacent to the project site are all currently active and open streets to the Public. Haul routes shall be coordinated through the development of traffic control plans submitted to and approved by Clark County Department of Public Works with copies available to other agencies, developers, contractors and organizations on an as needed basis. **The major disposal haul route if utilized would be from project site from Fort Apache Road and Post Road alignments thence north on Fort Apache to Russell Road, thence east on Russell Road crossing busy Durango Drive (may not have traffic signal at Russell Road and Durango Drive) thence into optional designated disposal site (also known as Russell Road Disposal Site) located immediately south of Flamingo Detention Basin.**

3.3 EXCAVATION, BLASTING

Any method used to excavate the structure or channel using explosives shall be subject to the approval by the Contracting Officer.

3.3.1 General Requirements

The drilling and blasting program and methods shall be the minimum necessary to break up the rock and/or caliche/cemented alluvium into bulldozer-manageable sized pieces for removal. Only the minimum strength explosive that will accomplish the fracturing will be allowed. If multiple charges are deemed necessary, they will be sequenced to produce good breakage of the rock or caliche/cemented alluvium and reduce airblast (sonic impacts) and ground vibrations to minimal levels. In the design of the blasting pattern, no blastholes will be permitted within 60 meters of an active tortoise or Gila Monster burrow. A qualified desert tortoise ecologist is required to be present during all blasting operations to ensure that there are no occupied burrows and/or to remove tortoises or Gila Monsters from the surface or burrows within the 60 meter limit. The desert tortoise ecologist will provide a short report with field notes to

the Contracting Officer. The desert tortoise ecologist will be provided by the Contractor as his own expense. Additional restrictions may be imposed during the hibernation period (15 November through 15 March) to protect hibernating tortoises, if necessary and directed by the Contracting Officer. The Contractor shall strictly comply with all State and local regulations regarding construction blasting (e.g., Uniform Standard Specifications for Public Works Construction Off-Site Improvements, Clark County Area, Nevada, Third Edition, subsections 107.10, 203.03.03, and 208.03.01, and Engineer Manual (EM) 1110-2-3800, including all notice and reporting requirements). Under no circumstances shall blasting be performed within 30 meters of concrete that has been placed less than seven days. Blasting within 30 meters of concrete older than seven days will be permitted only if approved by the Contracting Officer.

3.3.2 Blasting

Prior to drilling for each blast, the Contractor shall submit a Pre-Blast data report plan on an approved form, which includes the pertinent data on the location by station, ground surface elevation in the area of the blast; diameter, spacing, depth, overdepth, pattern and inclination of blast holes; the type, strength, amount, distribution and powder factor for the explosives used per hole and per blast; the sequence and pattern of delays, and description and purpose of special methods. The loading of holes shall be done in the presence of a Government inspector. Acceptance by the Contracting Officer of the Pre-Blast data report plan will not relieve the Contractor of his sole responsibility to produce satisfactory results as set forth in these specifications. Drilling and blasting shall be done only to the depth, amount, and at such locations, with explosives of such quantity, distribution and density that will not produce unsafe or damaged rock and/or caliche/cemented alluvium surfaces or damage beyond the prescribed excavation limits. When a drilling and blasting program results in damage to the excavation, or to natural or man-made features, or is injurious to wildlife and habitat, the Contractor will be required to devise and employ methods which will prevent such damage. The revision may include special methods such as presplit and zone blasting, shallow lifts, reduction in size of individual blasts, small diameter blast holes, closely spaced blast holes, reduction of explosives, greater distribution of explosives by use of decking and primacord or variation in density of explosives.

3.3.2.1 BLASTING AND UTILITY LINES AND EXISTING STRUCTURES

Blasting will not be permitted close to existing utility lines and/or existing structures. Contractor shall use other rock excavation techniques, and deploy all means necessary to break-out and remove layers of highly cemented soils nearby the utility lines. Contractor shall coordinate with utility owners prior to excavation and blasting in the vicinity of utility lines, **and the LVVWD Pumping Station east of Ft. Apache Road at Eldorado Lane, to include verification of the required clearances from such utilities or this pumping station.**

3.3.3 Overshooting

The Contractor shall use controlled blasting techniques so as not to

overshoot. All possible care shall be exercised in drilling and blasting operations to prevent formation of discontinuities and to minimize over-break and blast damage of adjacent unexcavated ground and structures. Any material outside the authorized limits which may be shattered or loosened because of blasting shall be removed and/or re-compacted by the Contractor at his expense. Shattered or loosened material below the bottom limits of the required excavation shall be uniformly distributed and compacted or otherwise disposed of in a manner satisfactory to the Contracting Officer. The Contractor shall discontinue any method of blasting which leads to overshooting or is dangerous to the public, destructive of natural or man-made features, or is injurious to wildlife and habitat.

3.3.4 Pre-excavation Survey

The Contractor shall perform a pre-excavation survey which shall include as a minimum; detailed examination of adjacent structures, including video taping and installation of crack monitoring tape along existing structural cracks. **The pre-excavation survey shall extend to a distance of 100 meters or the distance required by the local jurisdiction having authority for same, whichever is greater.** Also included shall be a seismic **vibration monitoring** survey performed by a certified seismic **monitoring contractor** to determine limiting charge weights, distances to structures, etc. for all areas where blasting is proposed and limiting ball weights, height of drop, etc., for all areas where headache balls and/or hoe ram techniques are proposed.

3.3.4.1 Vibration Monitoring

During construction, the Contractor shall hire a certified seismic survey **contractor** to perform a **vibration** monitoring program to determine the effects of any blasting, headache ball or hoe ram use, or any other specialized excavation technique. Particle velocities measured at an existing structure or **61** meters from the blasting, **whichever** is closest, shall not exceed statutory limits or 12.5 millimeters per second (whether the result of blasting or other excavation technique). In addition to these requirements, the Contractor shall provide suitable vibration monitoring equipment to measure and record ground motions at the 60 meter distance.

3.3.5 Notifications

The Contractor shall notify each property owner and public utility company having structures or facilities in proximity to the site of the work of his intention to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property from injury. Any blasting adjacent to or crossing existing utilities shall be fully coordinated with the owner of the effected utility to include hole spacing, loading and vibration.

3.3.6 Qualifications

During blasting operations, the Contractor shall have on site, and in immediate charge of the blasting, a licensed blaster acceptable to the

Contracting Officer who has had no less than 3 years of experience in controlled blasting and rock excavation operations. Powder handlers shall have had no less than one year continuous experience in preparation and loading of powder charges.

3.3.7 Post-Blast Data Reports

In addition to the reporting requirements required above, a separate Post-Blast Data Report of each blast shall be prepared and furnished to the Contracting Officer on an approved form. The report shall indicate the location of the blast by specific stationing, ground surface elevation, depth of round, pounds of explosives used by type and grade, total number of loaded holes, total pounds per delay, quantity and kind of explosive in each hole, maximum measured blast vibration, and all other blast information directed by the Contracting Officer. Original or legible copies of the report shall be provided to the Contracting Officer within 24 hours of the blast event.

3.3.8 Explosives

3.3.8.1 Safety

The contractor shall fully comply with Section 29, Blasting, COE EM 385-1-1 and any Local or State Laws and Regulations applicable to the proposed Blasting Plan.

3.3.8.2 Storage

The Contractor shall submit to the Contracting Officer, for approval, drawings showing the explosive storage locations, access to and type of construction of the proposed storage magazine for explosives, and cap house. The explosives storage magazine and other facilities may be located on project lands if a satisfactory location can be found and is approved by the Contracting Officer. The Contractor shall maintain the explosive storage area at his own expense. The explosives storage magazine shall be securely locked when not in use.

3.4 PRESERVATION OF PROPERTY

All excavation operations shall be conducted in such a manner that concrete structures, embankments, utilities, or other facilities and improvements which are to remain in place permanently will not be subjected to settlement or horizontal movement. The Contractor shall furnish and install sheet piling, cribbing, bulkheads, shores, or whatever means may be necessary to adequately support material carrying such improvements or to support the improvements themselves and shall maintain such means in position until they are no longer needed. Temporary sheet piling, cribbing, bulkheads, shores or other protective means shall remain the property of the Contractor and when no longer needed shall be removed from the site. The Contractor shall submit for approval shop drawings showing proposed method of bracing which he intends to use. All shoring and bracing shall be designed so that it is effective to the bottom of the excavation, and shall be based upon calculation of pressures exerted by (and the condition and nature of) the materials to be retained, including

surcharge imparted to the side of the trench by equipment and stored materials. Removal of shoring shall be performed in such manner as not to disturb or damage the finished concrete or other facility.

3.5 EXCAVATION FOR STRUCTURES

Excavation within the vicinity of existing structures, utilities, roads, and drainage pipes to remain in place shall be performed in a manner to prevent damage to the structure. Earth banks and facilities to remain in place shall be supported as necessary during excavation. Potential for damage resulting from severe vibration may limit the Contractor's operations or choice of equipment. In general, unless otherwise shown or specified, the actual side slopes shall be in accordance with COE EM 385-1-1.

3.6 EXCAVATION CHANNEL

Channel excavation consists of the removal of all materials within the lines and grades indicated.

3.7 EXCAVATION OF BASIN

Basin excavation consists of the removal of all materials to the lines and grades indicated. The finished surface shall be reasonably smooth, free from irregular surface changes, and shall not vary more than 100 millimeters above or below the indicated grade, except that either extreme of such tolerance shall not be continuous over an area greater than 50 square meters.

No part of the basin area shall be excavated below the finished contours shown on the drawings. If the actual quantities deviate from the estimated quantities, basin area will be expanded, and Contracting Officer will direct additional basin excavation based on the required quantities and final grading plan. The basin excavation area shall be regular in shape, graded smoothly and graded to drain. Side slopes shall not be steeper than one vertical to three horizontal and shall be uniform for the entire length of any one side, unless otherwise directed.

3.8 EXCAVATION FOUNDATIONS

3.8.1 Excavation of Inspection Trench

Inspection trench excavation consists of the removal of all materials to the lines and grades indicated after stripping. Additional excavation other than that shown on the project plans may be directed by the Contracting Officer.

3.8.2 Excavation of Dam Foundation

Excavation dam foundation consist of removal of all materials within footprint of the dam embankment to the lines and grades shown on the drawings after stripping. Additional excavation other than that shown on the project plans may be directed by the Contracting Officer. The finished surface shall be reasonably smooth, free from irregular surface changes, and shall not vary more than 50 millimeters above or below the indicated grade, except that either extreme of such tolerance shall not be continuous over an area greater than 50 square meters.

3.9 EXCAVATION OF OUTLET CONDUIT

Excavation of outlet conduit consists of the removal of all materials to the lines and grades indicated for outlet conduit construction.

3.10 REMOVAL OF UNSATISFACTORY SOILS AND MATERIALS

The removal of soils or materials which are unsatisfactory for the foundation of the channel, or structures may be required in certain areas. Unsatisfactory soils or materials include but are not limited to those materials containing roots and other organic matter, trash, debris and materials classified in ASTM D 2487, as Pt, OH, OL, CH, MH, **ML**, **CL-ML**, and materials too wet to support construction equipment. Channel and Embankment subgrade materials that cannot be brought to 95% compaction after scarification, shall be removed. When removal of unsatisfactory material and/or unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government. The Contractor will be required to excavate any such areas to the depth directed and backfill the removal areas with compacted fill conforming to the requirements of Paragraph GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS. Soils and materials that are unsatisfactory shall become the property of the Contractor and shall be removed from the project site in accordance with requirements Section 01355 ENVIRONMENTAL PROTECTION and Section 01200 GENERAL REQUIREMENTS. No excavated material or waste of any kind shall be removed beyond the project limits under this contract without the express written authority of the Contracting Officer, or as allowed under the contract.

3.11 DISPOSITION AND DISPOSAL OF EXCAVATED MATERIALS

Excavated materials suitable for required fills shall be placed in temporary stockpiles or used directly in the work. Satisfactory excess excavated natural ground and surface material and soils not utilized as part of the construction shall become the property of the Contractor, and may be hauled and processed and stockpiled and graded in the optional designated disposal sites at no additional cost to the Government or disposed off project site at no additional cost to the Government.

The Contractor at his discretion may dispose of satisfactory excess excavated material originating from the construction of the F-4 Channel from non-BLM Lands (See T sheets for BLM Lands Boundary), the F-3 Channel, and the 5th Cell Channel as follows: into the optional designated disposal site shown on the drawings and in accordance with paragraph "Optional Designated Disposal Site" of this section at no additional cost to the Government, and/or to dispose the satisfactory excess excavated material off site at no additional cost to the Government. The optional designated disposal site has capacity for a maximum of 42,530 cubic meters of satisfactory excess excavated material. See also Section 01200 GENERAL REQUIREMENTS.

Materials and soils that the Contractor elects to be placed in the optional designated disposal sites shall be satisfactory excess excavated material

originating from the construction of the F-4 Channel from non-BLM Lands, the F-3 Channel, and the 5th Cell Channel and shall be free from trash, dumped debris and demolition products, and shall consist of no materials and soils suspected of having characteristics of hazardous and/or toxic waste materials characterized as unsatisfactory soil and material including trash, dumped debris and demolition products, and shall meet the requirements of paragraph "OPTIONAL DESIGNATED DISPOSAL SITE" of this section. Materials and soils suspected of having characteristics of hazardous and/or toxic waste materials characterized as unsatisfactory soil including trash, dumped debris and demolition products and unstable soils shall become the property of the Contractor and shall be removed from the project site in accordance with requirements Section 01355 ENVIRONMENTAL PROTECTION and Section 01200 GENERAL REQUIREMENTS. No excavated material or waste of any kind shall be removed beyond the project limits under this contract without the express written authority of the Contracting Officer, or as allowed under the contract. Prior to placing material, the approved stockpile area(s) and optional designated disposal sites shall be cleared of trash and vegetation. Vegetation shall be removed by grading the existing ground surface to a depth of 150 mm. Any stockpiles shall be placed in a manner to preclude ponding of water. The optional designated disposal sites shall be graded and filled as per plan(s) and in accordance with paragraph "OPTIONAL DESIGNATED DISPOSAL SITE" of this section. Natural ground and surface soils and materials thus excavated and removed will then be designated as either:

- i. Materials to be salvaged, or
- ii. Scrap and unsatisfactory materials and soils and unstable materials and soils to be treated as specified above and in Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS.

3.11.1 Hauled Excavated Material

The Contractor shall have a haul route plan for haul within the project limits, including removal of required excavated materials and placing fill materials and hauling of excess excavated material, that utilizes the drawings provided. The haul route plan shall be submitted to the Contracting Officer for approval. Haul routes for transport of the excess excavated material shown on the drawing sheets are approximate. See Section 01200 GENERAL REQUIREMENTS for additional requirements and information on excavated material haul routes. The Contractor will be responsible for obtaining all permits and licenses necessary to haul material off-site. The Contractor will provide to the Contracting Officer three copies of the proposed street haul route plan for transport of all excess excavated material.

3.11.2 OPTIONAL DESIGNATED DISPOSAL SITE

The Contractor at his discretion may dispose of satisfactory excess excavated material originating from the construction of the F-4 Channel from non-BLM Lands, the F-3 Channel, and the 5th Cell Channel, in the optional designated disposal site, and/or to dispose the satisfactory excess excavated material off site. The optional designated disposal site has capacity for a maximum of 42,530 cubic meters of satisfactory excess excavated material.

3.11.2.1 General - Optional Designated Disposal Site

Excess excavated satisfactory material originating from the construction of the F-4 Channel from non-BLM Lands, the F-3 Channel, and the 5th Cell Channel shall be hauled, processed as necessary, stockpiled, and graded to the grade and lines as shown on the optional designated disposal site drawings (also known as Russell Road Disposal Site drawings). The material will be processed as necessary to meet the size requirements of paragraph: FILL MATERIAL FROM EXCESS EXCAVATED MATERIAL FOR OPTIONAL DESIGNATED DISPOSAL SITE. Fills in the optional designated disposal site shall be placed and graded in accordance with paragraph: PLACEMENT OF EXCESS EXCAVATED MATERIAL IN OPTIONAL DESIGNATED DISPOSAL SITE. Prior to hauling excess excavated material to the optional designated disposal site, the Contractor shall submit a pre-construction topographic survey of the optional designated disposal site with 0.5 meter contour intervals. Upon completion of the compacted fill earthwork within the optional designated disposal site, the Contractor shall submit a post-construction topographic survey of the optional designated disposal site with 0.5 meter contour intervals for the compacted fill work. All surveys shall be in accordance with the requirements of Section 01200 GENERAL REQUIREMENTS, paragraph : CONTRACTOR'S SURVEYS.

3.11.2.2 Preparation for Placing in Optional Designated Disposal Site

The foundation for the fill to be placed shall be cleared of all existing obstructions, vegetation and debris. Any trash or debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. Unsatisfactory or unstable (too wet) material and soils not meeting the requirements for fill material shall be removed where directed.

3.11.2.3 FILL MATERIAL FROM EXCESS EXCAVATED MATERIAL FOR OPTIONAL DESIGNATED DISPOSAL SITE

Excess excavation material including rocks and cemented soils shall be hauled to the optional designated disposal site as shown on the drawings, processed as necessary by breakdown, crushing or otherwise reduced in sizes not exceeding 610 mm and then utilized as stockpiled fill in accordance with grading requirements of the drawing OPTIONAL DESIGNATED DISPOSAL SITE FILL AREA GRADING PLAN and paragraph: PLACEMENT OF EXCESS EXCAVATED MATERIAL IN OPTIONAL DESIGNATED DISPOSAL SITE.

3.11.2.4 PLACEMENT OF EXCESS EXCAVATED MATERIAL IN OPTIONAL DESIGNATED DISPOSAL SITE

Excess excavated material placed as fill in the optional designated disposal site shall be placed and graded with suitable equipment to the lines and grades shown on the drawing OPTIONAL DESIGNATED DISPOSAL SITE FILL AREA GRADING PLAN.

3.12 OVERCUT

Except as otherwise specified or specifically ordered in writing, any overcut or excavation beyond the lines and grades indicated in the plans

(or as directed) shall be backfilled with compacted fill conforming to the Paragraph GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS, and to Paragraph COMPACTED FILL, CHANNEL, or concrete conforming to the Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS. Subgrades shall be prepared in accordance with paragraph SUBGRADE PREPARATION. All excavating, backfilling, compacting of backfill, and concreting occasioned thereby shall be by the Contractor at no additional cost to the Government.

Any overcut under existing or newly constructed channels and structures shall be backfilled with concrete.

3.13 COMPACTION EQUIPMENT

Compaction shall be accomplished by tamping roller, rubber tired roller vibratory compactor or mechanical tampers. All equipment, tools, and machines shall be maintained in satisfactory working condition at all times. Compaction equipment shall be suitable for consistently producing uniform soil densities.

3.14 GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS

3.14.1 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

3.14.1.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. The laboratory must be validated for the Corps of Engineers. No work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer. The first inspection shall be at the expense of the Government. Cost incurred for any subsequent inspection required because of failure of the first inspection will be charged to the Contractor.

3.14.2 Control

Moisture-density relations shall be established by the Contractor. The soil used for each maximum density test shall be classified in accordance with ASTM D 2487 and shall include a particle size analysis in accordance with ASTM D 422. At least one five point maximum density test shall be made for every 10 field density tests. Field density test shall be performed by the Contractor at the frequency established in paragraph Field Control, and in such locations to insure that the specified density is being obtained. Moisture-density relations and field densities shall be reported on approved forms. One copy of density data less dry weight determinations shall be provided on the day each test is taken. The completed field density tests report shall be provided with the Contractor Quality Control Report on the work day following the test.

3.14.2.1 Laboratory Control

Treating of Compacted Fill Materials. Moisture-density relations shall be

established by the Contractor. One moisture-density relation shall be made for each classification, blend or change in classification of soil materials encountered. Approval of moisture-density relations shall be obtained prior to the compacting of any material in the work. The moisture-density relations shall be determined in a laboratory in accordance with ASTM D 1557.

- a. The desired amount of mixing water will be added for each compaction test specimen, mixed well, and the mixture will be placed in a container with an airtight cover and allowed to cure for 24 hours. A shorter curing time may be allowed where tests show that shortening the curing time will not affect the results.

3.14.2.2 Field Control

Field in-place density shall be determined in accordance with ASTM D 1556. The field moisture content shall be determined in accordance with ASTM D 2216. Determination of in-place densities using the nuclear method ASTM D 2922 may be used to supplement the sand cone density tests ASTM D 1556. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in ASTM D 1556 **and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil.** When material contain considerable amount of rock or coarse gravel in-place density test method ASTM D 4914 or ASTM D 5030 shall be used. At least one adjacent sand cone test **with accompanying particle size analysis in accordance with ASTM D 422** shall be performed for every ten nuclear density tests performed. If field density tests determined by the nuclear method vary by more than 0.5 kilonewtons per cubic meter from comparison sand-cone tests, and are consistently high or low, adjustment of the calibration curve is necessary.

a. In-Place Densities

(1) One test per 750 cubic meters, for the first 7,500 cubic meters of material and one test for each 1,500 cubic meters thereafter, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by other than hand-operated machines. At least one test shall be made in each 600 mm layer of compacted fill or backfill processed as a unit and not less than one test shall be made in each area. One test per 300 cubic meters, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by hand-operated machines. The contractor CQC shall maintain a log of all tests, which will, updated and submitted to the contracting officer on a weekly basis. The test log shall include: Test number (if retest shall include retest number), date, feature of work, station and offset, elevation, weight of wet soil, weight of dry soil, percent of compaction, optimum moisture content, maximum dry unit weight, soil classification, in-place density test methods either sand-cone or nuclear densimeter.

(2) One test per 400 cubic meters, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by hand-operated machines. The Contractor CQC shall maintain a log of all tests which will updated and submitted to the Contracting Officer on a weekly

basis. The test log shall include: Test number (if retest shall include retest number), date, feature of work, station and offset, weight of wet soil, weight of dry soil, percent of compaction, optimum moisture content, maximum dry unit weight, soil classification, in-place density test methods either sand-cone or nuclear densimeter.

3.14.2.3 Record Testing:

Record testing shall be conducted on two representative samples of as-constructed compacted fill, embankment, to verify strength characteristics. The Contractor will modify his operations to allow for the Contractor, under Contracting Officer/Government observation, to collect samples as indicated hereafter. The Contractor shall notify the Contracting Officer/Government at least 48 hours in advance of the actual collection of samples. The Contractor, under Contracting Officer/Government observation, will collect disturbed record test samples (500 kg at each location) when 1/3 and 2/3 of the embankment fill height has been placed. The Contractor shall provide the containers in which to collect the samples. The samples will be shipped and transported by the Contractor to the Government selected laboratory. Costs incidental to the handling and transportation of samples or materials shall be borne by the Contractor. Coordination for each specific test, exact delivery location, and dates will be made by the Contracting Officer's Representative. The Contractor shall replace material taken for the sample with equivalent materials, compacted to the specified contract requirements.

3.14.3 Settling of Fills or Backfills with Water

Settling of fills or backfills with water will not be permitted.

3.14.4 Fill Material

Fill material shall be obtained from the required excavation. Materials considered unsatisfactory for use as compacted fill include but are not limited to those materials containing roots and other organic matter, trash, debris, chunks or clumps of cemented material, and shall contain no stone whose greatest dimension is more than 3/4 the lift thickness, **has between 80 and 100 percent passing 75 millimeters, and has between 35 and 70 percent passing 4.75 millimeters.** The Contractor shall expect to break-down, crush or otherwise process required excavation for use as fill material due to the cementation of in-situ soils. Materials classified in ASTM D 2487 as MH, CH, Pt, OH, **ML, CL-ML**, and OL are also considered unsatisfactory for use as compacted fill. The fill material shall have sufficient amount of fine material to fill the voids between coarser aggregate.

Material for compacted fill behind concrete structures shall contain less than 30 percent by weight passing the .075 mm sieve and shall contain no stone or particle larger than 75 mm.

Material for compacted fill in Grading Easements (GE) shall contain less than 30 percent by weight passing the .075 mm sieve and shall contain no stone or particle larger than 300 mm.

Contractor shall not place BLM material in the Grading Easement fill areas that are depicted within Grading Easements (GE) that are adjacent to the F-4 Channel on sheet T8 and the F-4 Channel and F-3 Channel and 5th Cell Structure on sheet T11 and T12.

3.14.5 Placement

Fill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 17.2 megapascals when tested in accordance with the Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS. Fill shall not be placed over covered channels (roof decks) until the concrete has obtained 70% of the contract required design strength. Heavy equipment shall not be operated over pipes and buried structures until at least 600 mm of fill material have been placed and compacted over them. Material from the top of the pipe or buried structure to 600 mm above pipe or buried structure shall be compacted by mechanical tampers or other equipment approved by the Contracting Officer. Compacted fill shall be placed with suitable equipment in horizontal layers which before compaction, shall not exceed 300 mm in depth for rubber-tired or vibratory rollers, 200 mm in depth for tamping rollers, and 100 mm in depth when mechanical tampers are used. The Contractor may vary the layer thickness within these limits for most efficient operations. Material containing stones shall be placed in a manner to prevent the stones from striking the concrete structures and to prevent the formation of voids.

3.14.5.1 Ground Vibration

Contractor is responsible for any damages to the nearby housing and structures due to the ground vibration caused by movement of heavy conventional equipments or vibratory rollers. The contractor shall deploy all means necessary to mitigate or preclude ground vibration when compaction equipments are operating close by the residential areas.

3.14.6 Moisture Content

Material shall have a uniform moisture content while being placed and compacted. Water shall be added at the source, if required, or by sprinkling each layer of material during placement. Uniform distribution of moisture shall be obtained by disking, harrowing, or otherwise manipulating the soil during and after time water is added. Material containing an excess of moisture shall be manipulated with suitable implements to facilitate maximum aeration and shall be permitted to dry to the proper consistency before being compacted. Fill shall have a maximum moisture content of not more than 2 percent above optimum and a minimum moisture content of not less than 2 percent below optimum.

3.14.7 Compaction

No layer of fill shall be compacted before the practicable uniform moisture content has been obtained. Scarified areas shall be compacted as specified for the fill placed thereon. Rollers will not be permitted to operate within 300 mm of channel or structure walls or over buried structures until the compacted fill over the top of the structures has reached a depth of

600 mm. Compaction equipment shall be so operated that structures are not damaged nor overstressed during compaction operations. Mechanical tampers shall be used for compaction of fill material adjacent to structures where rolling equipment is impracticable for use in compaction.

3.15 COMPACTED FILL, CHANNEL

3.15.1 Invert

3.15.1.1 Preparation for Placing

The foundation for the compacted fill to be placed and compacted fill at the channel shall be cleared of all existing obstructions, vegetation and debris. Any trash or debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. Unsatisfactory or unstable (too wet) material and soils not meeting the requirements for fill material shall be removed where directed. The existing surfaces for the compacted fill at the channel site shall be scarified to a depth of 150 mm and proofrolled by four passes of the compaction equipment. The subgrade for the channel shall be prepared in accordance with paragraph SUBGRADE PREPARATION.

3.15.1.2 Compaction

Each layer of the material shall be compacted to not less than 95 percent of maximum density, per ASTM D 1557.

3.15.2 Behind Channel Walls

3.15.2.1 Limitations on Equipment

The gross weight of any piece of equipment, or the combined weight of any combinations of equipment coupled together, used to place, moisten and/or compact fill behind channel walls and up to 600 mm above the top of covered sections shall not exceed 16,000 kilograms, including dynamic forces produced by vibratory equipment. Equipment used to compact the fill behind the channel walls shall be of such size as to be capable of operating in the area between the cut slope and the channel wall. Compaction equipment will not be required to operate at elevations lower than 600 mm above the top of wall footings. This equipment shall be of such size as to be capable of operating in the area between the cut slope and the channel wall at any point 600 mm above the top of the heel of wall footings.

3.15.2.2 Construction Balance

Fills behind wall on one side of the channel shall not exceed by more than 0.610 meters the height of the fill behind the opposite channel wall at any time during construction.

3.15.2.3 Compaction

Each layer of fill behind channel walls, shall be compacted to not less than 90 percent of maximum density, per ASTM D 1557. The top 300 mm of the maintenance road fill adjacent to the channel wall shall be compacted to

not less than 95 percent of maximum density per ASTM D 1557.

3.15.2.4 Trimming

The top of fill adjacent to channel walls shall be trimmed to the lines indicated on the drawings with a tolerance of plus or minus 25 mm. Any material loosened by trimming shall be recompact and the area moistened and compacted with one pass of a smooth-wheeled roller. Tolerances shall apply after rolling. Fill slopes shall be trimmed to a uniform alignment at the top of the berm and reasonably uniform slope at or outside the lines shown on the drawings.

3.15.2.5 Backfill Against Plywood at Ends of Pipe and Sewer Stubs

Plywood shall be braced or otherwise held flush against the end of the pipe during backfilling. The Contractor shall make sure the plywood is of sufficient size to adequately cover the pipe or sewer stub opening. The Contractor shall attach blocks or shims to roughly fit the inside diameter of the pipe to assure that the plywood is not displaced during backfilling.

3.15.3 Compacted Fill Over Covered Channel

3.15.3.1 General

No fill material shall be placed over the top of the covered channel until all voids at the sides of the covered channel have been filled as described below, and until all caved material has been compacted to the specified density to the top of the roof slab.

3.15.3.2 Material

Materials for filling voids shall be clean sand, free of trash, organic materials, debris, and with 100 percent passing the 4.75 mm sieve and not more than 10 percent passing the 150 mm sieve.

3.15.3.3 Placement

The first layer of fill over the concrete box section shall be 300 mm in thickness and shall be compacted with a rubber-tired or vibratory roller having a maximum weight of 9,000 kilograms. The remainder of the fill shall be deposited in 150 mm layers and compacted with rubber-tired or vibratory rollers, or other approved equipment with a maximum weight of 9,000 kilograms until the structure has a cover of at least 600 mm. The remainder of the compacted fill shall be placed as specified in paragraph COMPACTED FILL, CHANNEL of this section.

3.15.3.4 Contractors Option

If the Contractor elects to leave the inside forms and shoring in place, permission will be granted to place fill material 48 hours after concrete has been placed.

3.15.3.5 Compaction

Each layer of fill on top of the covered channel shall be compacted to not less than 95 percent of maximum density, per ASTM D 1557. Compacted Fill under streets and maintenance roads shall be compacted per paragraph COMPACTED FILL, ROADWAY.

3.15.4 Compacted Fill, Roadway

3.15.4.1 Compaction

Fill shall be compacted to not less than 95 percent of maximum density per ASTM D 1557 for the width of all traveled ways plus 1 meter on each side thereof.

3.15.4.2 Trimming

All street and maintenance road shoulders and side slopes shall be trimmed to the lines indicated on the drawings with a tolerance of plus or minus 25 millimeters. Any material loosened by trimming shall be recompactd and the area moistened and compacted with one pass of a smooth-wheeled roller.

Tolerances shall apply after rolling. Fill slopes shall be trimmed to a reasonably uniform slope at or outside the lines shown on the drawings.

3.15.5 Compacted Fill, Grading Easements (GE)

3.15.5.1 Preparation for Placing in Grading Easements (GE)

The foundation for the compacted fill to be placed and compacted fill in the Grading Easements (GE) shall be cleared of all existing obstructions, vegetation and debris. Any trash or debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. Unsatisfactory or unstable (too wet) material and soils not meeting the requirements for fill material shall be removed where directed. The existing surfaces for the compacted fill in the Grading Easements (GE) sites shall be scarified to a depth of 150 mm and proofrolled by four passes of the compaction equipment.

3.15.5.2 Placement and Compaction, Grading Easements (GE)

Each layer of the material shall be compacted to not less than 92 percent of maximum density, per ASTM D 1557. The Contractor shall construct grading easement compacted fill by placing successive horizontal lifts over the entire plane of the work surface. All fill materials shall be placed in compacted horizontal lifts not more than 300 mm thickness. Placement of adjacent fills at different heights is prohibited.

3.16 COMPACTED FILL, DAM EMBANKMENT

3.16.1 Foundation Preparation

Before placing material for compacted fill, the foundation surface shall be cleared of all existing obstructions, vegetation, debris, and stripped of surface soils in accordance with paragraph STRIPPING of this Section 02300 EARTHWORK, Section 02910 NATIVE PLANT EXTRACTION, SALVAGE AND STORAGE, and Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. Within the dam embankment footprint, excluding miscellaneous fill zone, the following

shall be removed: (1) the upper 1.5 meters of foundation soil within an inspection trench, 4 meters wide, along the centerline of the embankment, (2) the upper 1.5 meters of foundation soil in designated wash areas, (3) the upper 0.610 meters of foundation soil within the footprint of the dam embankment outside of the inspection trench and designated wash areas, and (4) the material shall be removed in accordance with SECTION 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS and this SECTION 02300 EARTHWORK. The inspection trench and the banks of the existing washes shall be excavated as shown on the plans and in accordance with this SECTION 02300 EARTHWORK. Depths may be reduced where hard cemented materials or bedrock is encountered subject to the approval of the Contracting Officer. Unsatisfactory materials not meeting the requirements for fill material shall be removed where directed. The existing surfaces, including the excavated inspection trench and banks and the areas beneath the outlet structure and conduit within the footprint of the dam embankment, shall be scarified to a depth of 150 millimeters and proofrolled by four passes of the compaction equipment before placing the fill. Sloped ground surfaces steeper than one vertical to four horizontal, on which fill or compacted backfill is to be placed, shall be stepped in such a manner that the compaction equipment will bear on the full depth of the layer.

3.16.1.1 Foundation Preparation, Rock Abutments

In the case of exposed rock surfaces at an abutment, detached rock blocks and loose surface material shall be removed. The use of heavy, tracked equipment shall be minimized to protect the in situ rock surfaces. Excavation and cleaning of the abutment may result in exposure of natural bedding planes and joints thereby creating "steps" on the abutment. Large rock overhangs and protrusions shall be removed by the use of pre-splitting or line drilling techniques in such a manner as to minimize damage to the underlying rock, or the spaces beneath overhangs and around protrusions shall be filled with tamped concrete so that satisfactory compaction of embankment materials can be accomplished. Surfaces steeper than 4V:1H shall not be more than 1.0 meter in height, and benches of sufficient width shall be provided as necessary so that the average slope of any rock face is not steeper than 2V:1H. Rough areas that, in the opinion of the Contracting Officer, the compaction of the embankment materials cannot be accomplished satisfactorily with power tampers or other specified compaction equipment shall be filled with mortar or concrete, as directed to the extent necessary, to merit satisfactory use of the compaction equipment. All rock surfaces upon which or against which embankment materials are to be placed shall be broom cleaned. All open joints and cracks greater than 13 mm in width shall be filled with mortar to the depths cleaned. Those portions of such rock surfaces where there are holes greater than 100 mm deep and smaller than 610 mm across shall be filled with mortar or concrete. Mortar and concrete, including forming as necessary, shall conform with the applicable provisions of Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS. In no case shall a thin coat of mortar be left on smooth, intact rock surfaces. Final cleaning of the residual rock surfaces shall take place as the embankment is being raised. Fill materials shall not be placed against embankment abutments until approved by the Contracting Officer.

3.16.2 PLACEMENT AND COMPACTION, DAM EMBANKMENT

Each layer of the material shall be compacted to not less than 95 percent of maximum density, per ASTM D 1557. The Contractor shall construct dam embankment by placing successive horizontal lifts over the entire plane of the work surface. All fill materials shall be placed parallel to axis of dam in compacted horizontal lifts less than 300 mm thickness. Placement of adjacent fills at different heights is prohibited. Where interim slopes are allowed by the Contracting Officer, the Contractor shall grade slopes flatter than 3H:1V. The Contractor must bench and moisture condition interim slopes immediately prior to placement of each lift of new fill against interim slopes. Whenever a compacted surface of any lift has been made too smooth to bond to successive layer by concentration of hauling equipment or other reasons, the Contractor shall loosen by scarifying or other equivalent methods and moisture condition surface prior to placement of the succeeding lift. The embankment lift surfaces shall be kept moist. If a lift surface dries out and cracks, the Contractor shall moisture condition to specified range and rework the lift prior to placement of the subsequent lift. Finished surfaces shall be overbuilt and cut to final grade.

3.16.3 Compacted Fill For RCB Outlet Conduit

3.16.3.1 Compaction

Each layer of the material shall be compacted to not less than 95 percent of maximum density, per ASTM D 1557, and shall be in accordance with paragraph PLACEMENT AND COMPACTION, DAM EMBANKMENT and in accordance with paragraph LIMITATIONS ON EQUIPMENT, RCB OUTLET CONDUIT. Contractor shall utilize paragraph SUBGRADE FOR RCB OUTLET CONDUIT prior to installation of the RCB outlet conduit.

3.16.3.2 SUBGRADE FOR RCB OUTLET CONDUIT

Subgrade preparation for RCB outlet conduit shall include subgrade preparation for areas to receive concrete for RCB outlet conduit. All trash and debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. After the RCB outlet conduit alignment has been excavated to rough grade, the entire RCB outlet conduit invert shall be scarified to a depth of 0.15 meters, moisture conditioned and proofrolled by 4 passes of the compaction equipment and trimmed to a uniform grade and smoothed with a steel-wheeled roller to make the subgrade ready to receive concrete. If the subgrade is disturbed by the Contractor's operations or is overexcavated, or is soft or yielding, the subgrade shall be restored to grade and compacted to a density of 95 percent of maximum density, per ASTM D 1557. The finished surface of the subgrade shall not be more than 13 mm above the indicated grade at any point when tested with a 3 meters straightedge.

3.16.3.3 LIMITATIONS ON EQUIPMENT, RCB OUTLET CONDUIT

The gross weight of any piece of equipment, or the combined weight of any combinations of equipment coupled together, used to place, moisten and/or compact fill along the sides of the RCB outlet conduit and up to 600 mm above the top of the RCB outlet conduit shall not exceed 16,000 kilograms,

including dynamic forces produced by vibratory equipment. Equipment used to compact the fill along the sides and above the top of the RCB outlet conduit shall be of such size as to be capable of operating in the area between the cut slope and the RCB outlet conduit. Compaction equipment will be required to operate at elevations equivalent to the elevation of the bottom of the invert of the RCB outlet conduit. This equipment shall be of such size as to be capable of operating in the area between the cut slope and the RCB outlet conduit.

3.16.4 Settlement

The Contractor shall delay Soil Cement (SC) placement for a maximum settlement period of 60 days after embankment in that area reaches full height in order to monitor anticipated settlement of the embankment. The Contractor shall install four surface settlement monuments, one each at Sta. 10+50.000, Sta. 11+50.000, Sta. 12+50.000, and Sta. 13+50.000 for the F-4 Embankment; the locations with respect to the Inlet Structure centerline will be determined by the Contracting Officer.

3.16.5 Settlement Monitoring

The monuments shall be surveyed by the Contractor within 24 hours of installation and the elevation surveyed on a weekly basis. The survey data shall be provided to the Contracting Officer for review to determine the need for further monitoring. If the survey data indicates there is inconsequential settlement, the Contracting Officer may approve Soil Cement placement before the 60 day settlement period expires. A settlement monument plan including typical details of the surface settlement monuments along with the plan to protect the monument during construction shall be provided by the Contractor for review not less than 14 calendar days prior to installation of the monument.

3.16.6 Settlement Monument Protection Plan

The location of the settlement monument shall be clearly marked and readily visible (red flagged) to equipment operators. In the event of damage to settlement monument or extension resulting from equipment operating within the specified area, the Contractor shall immediately notify the Contracting Officer and shall be responsible for restoring the settlement monument to working order.

3.16.7 Regrading of Embankment Crest

If the F-4 Debris basin embankment crest settles, the embankment shall be regraded to the lines and grades indicated after the settlement period is completed.

3.16.8 Basin

3.16.8.1 Location

Compacted fill for the basin shall consist of small amount of fill associated with the F-4 Debris basin grading and access roads to be placed outside of the F-4 Debris basin embankment footprint. This quantity shall

not be measured for payment but shall be considered incidental to basin excavation.

3.16.8.2 Preparation for Placing

The foundation for the compacted fill to be placed in the basin shall be cleared of all existing obstructions, vegetation and debris. Vegetation shall be salvaged in accordance with Section 02910 NATIVE PLANT EXTRACTION, SALVAGE AND STORAGE. Any trash or debris shall be removed in accordance with SECTION 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS and with this SECTION 02300 EARTHWORK. Unsuitable materials or unstable (too wet) not meeting the requirements for fill material shall be removed where directed. The existing surfaces for compacted fill in the basin shall be scarified to a depth of 0.15 meters and proofrolled by four passes of the compaction equipment.

3.16.8.3 Compaction

Each layer of the material shall be compacted to not less than 90 percent of maximum density, per ASTM D 1557.

3.17 BACKFILL

3.17.1 Structural Backfill

3.17.1.1 Location

Backfill shall consist of all fill against and/or around structures, except backfill for conduits and compacted fill, channel.

3.17.1.2 Material

Backfill material shall be obtained from the required excavation as approved by the Contracting Officer. In general, the best material available will be designated as backfill and fill about structures. Backfill may consist of sand, gravelly sand, and silty sands. Organic material, silt, clay, broken concrete or pavement, boulders and other unsatisfactory material shall not be used. Backfill for structures shall not contain any stones larger than 75 mm.

3.17.1.3 Placing

Backfill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 17.2 megapascals when tested in accordance with Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

3.17.1.4 Compaction

Compaction shall be not less than 95 percent of maximum density, per ASTM D 1557 unless noted or shown otherwise.

3.17.2 Slurry Backfill

Slurry backfill shall be in accordance with the applicable provisions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.18 SUBGRADE PREPARATION

3.18.1 Subgrade for Channel

Subgrade preparation for channel shall include subgrade preparation for areas to receive concrete, aggregate base course and/or bituminous paving for streets, access roads, maintenance roads, turnarounds, and invert access ramps. All trash and debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. After the channel has been excavated to rough grade, the entire channel invert, invert access ramp, and other area indicated above shall be scarified to a depth of 0.15 meters, moisture conditioned and proofrolled by 4 passes of the compaction equipment and trimmed to a uniform grade and smoothed with a steel-wheeled roller to make the subgrade ready to receive concrete. If the subgrade is disturbed by the Contractor's operations or is overexcavated, or is soft or yielding, the subgrade shall be restored to grade and compacted to a density of 95 percent of maximum density, per ASTM D 1557. The finished surface of the subgrade shall not be more than 13 mm above the indicated grade at any point when tested with a 3 meters straightedge.

3.19 TOPSOIL AND MISCELLANEOUS FILL

3.19.1 TOPSOIL

Topsoil shall consist of material stripped from the surface of excavation areas stockpiled for placement on the downstream side of the embankment in designated revegetation treatment areas. Topsoil shall be placed with a minimum thickness of 200 millimeters or as shown on the drawings. Topsoil shall be processed with soil amendments for Section 02930 EXTERIOR PLANTING. Miscellaneous Fill placed in accordance with paragraph Miscellaneous Fill of this section or in accordance with the drawings shall not be placed over the Topsoil placed in paragraph TOPSOIL of this section. Compaction other than that required by the controlled movement of the construction equipment will not be required.

3.19.2 MISCELLANEOUS FILL, BLM MATERIALS

Miscellaneous Fill, BLM Materials shall consist of satisfactory excess excavated material from excavation areas within BLM Lands and may also include excess topsoil stripped from the surface of excavation areas within BLM Lands. Miscellaneous Fill, BLM Materials shall be placed with a minimum thickness of 200 millimeters or to the lines and grades as shown on the drawings. Miscellaneous Fill, BLM materials shall not be placed over the Topsoil that is placed in accordance with paragraph TOPSOIL of this section. Compaction other than that required by the controlled movement of the construction equipment will not be required. The Contractor shall also conform to the paragraphs concerning BLM Lands material and non-BLM Lands material when utilizing satisfactory excess excavated material as miscellaneous fill material.

3.19.3 Landscape Fill, Blue Diamond Detention Basin

Landscape Fill, Blue Diamond Detention Basin, shall be placed in the lines and grades indicated on the drawings and shall be placed with suitable equipment in successive horizontal layers over the entire plane of the work surface and which shall not exceed 600 millimeters in depth before consolidation. Materials for Landscape Fill, Blue Diamond Detention Basin, shall not consist of rock or cobbles with dimensions greater than 50 mm in its greatest dimension, and shall not consist of cemented alluvium, but may consist of BLM topsoil not being reused. Landscape fill material so defined shall be utilized as landscape fill provided such material is placed in a manner that will prevent the formation of voids, and is placed not less than below finished grade (including finished grade of side slopes). No depressions in which water might pond shall be left in landscape fill area. The finished areas shall be sloped to drain. Compaction other than that obtained by the controlled movement of the construction equipment will not be required.

3.19.4 Landscape Fill, Flamingo Detention Basin

Landscape Fill, Flamingo Detention Basin, shall be placed in the lines and grades indicated on the drawings and shall be placed with suitable equipment in successive horizontal layers over the entire plane of the work surface and which shall not exceed 600 millimeters in depth before consolidation. Materials for Landscape Fill, Flamingo Detention Basin, shall not consist of rock or cobbles with dimensions greater than 50 mm in its greatest dimension, and shall not consist of cemented alluvium, and shall not consist of BLM topsoil. Landscape fill material so defined shall be utilized as landscape fill provided such material is placed in a manner that will prevent the formation of voids, and is placed not less than below finished grade (including finished grade of side slopes). No depressions in which water might pond shall be left in landscape fill area. The finished areas shall be sloped to drain. Compaction other than that obtained by the controlled movement of the construction equipment will not be required.

3.19.5 STONE/CALICHE

Stone/Caliche shall be placed in the lines and grades indicated on the drawings and shall be placed with suitable equipment in successive horizontal layers over the entire plane of the work surface and which shall not exceed 600 millimeters in depth before consolidation. Material, consisting of rock and cemented alluvium from the excavations on BLM Lands of this project, may be utilized provided such material does not exceed 600 millimeters in its greatest dimension, has between 40 and 100 percent passing 300 millimeters, has between 30 and 70 percent passing 150 millimeters, and not more than 15 percent passing 75 millimeters. Compaction will not be required.

3.19.6 Optional Designated Disposal Site (also known as Russell Road Disposal Site), Non-BLM Materials

At the Contractors option and at no additional cost to the Government, excess satisfactory excavated material from the project excavation areas of non-BLM Lands may be placed at the Optional Designated Disposal Site (also

known as Russell Road disposal site). The Contractor shall process the material such that the material will not exceed 610 mm in any dimension and the Contractor shall place the material to the lines and grades as shown on the drawings. Compaction other than that required by the controlled movement of the construction equipment will not be required. The Contractor shall also conform to the paragraphs concerning BLM Lands material and non-BLM Lands material when utilizing satisfactory excess excavated material as miscellaneous fill material.

3.20 FINISHING

3.20.1 EARTHWORK FINISHING

Prior to the application of the pre-emergent herbicide and dust palliative/soil stabilizer, all exposed earthen slopes and surfaces shall be finished to the grades shown on the drawings or as directed by the Engineer, including the removal of all existing vegetation and the filling and smoothing of erosional features and surface irregularities. The exposed finished surfaces shall then be scarified to a depth of 150 mm, compacted, and groomed to produce a smooth surface with all particles greater than 75 mm in diameter removed.

3.20.2 PRE-EMERGENT HERBICIDE

All exposed and disturbed surface areas in the project area not covered by revegetation as per Section 02921 SEEDING and as per Section 02930 EXTERIOR PLANTING and concrete or asphalt and prepared as described in paragraph EARTHWORK FINISHING shall be treated with a pre-emergent herbicide with the concentrations stated in paragraph PRE-EMERGENT HERBICIDE PRODUCT to discourage the growth of weeds and other vegetation. When called for, the pre-emergent herbicide shall be watered in per the manufacturer's recommendations and is to be applied prior to application of the pigmented dust palliative/soil stabilizer in paragraph PIGMENTED DUST PALLIATIVE/SOIL STABILIZER.

3.20.3 PIGMENTED DUST PALLIATIVE/SOIL STABILIZER

All exposed excavation and fill surfaces and disturbed surface areas in the project area not covered by concrete or asphalt and treated as per paragraph PRE-EMERGENT HERBICIDE or treated by revegetation as per Section 02921 SEEDING and/or as per Section 02930 EXTERIOR PLANTING shall be treated with a pigmented dust palliative/soil stabilizer for soil stabilization and dust control with the concentrations stated in paragraph PIGMENTED DUST PALLIATIVE/SOIL STABILIZER PRODUCT after construction is completed. The pigmented dust palliative/soil stabilizer shall be watered in per the manufacturer's recommendations.

Processed gypsum that has become partially air set, lumpy, or caked shall not be used. The plaster/cellulose fiber mulch stabilizer shall be applied at a rate of 2,240 kilograms of plaster per hectare and 1,685 kilograms of wood fiber mulch per hectare. The specified seed mixture shall be added to the stabilizer mulch slurry. The slurry shall be such that when applied, the material shall form a protective coating that reduces water and wind induced erosion. Application shall not be permitted during high winds or

when other weather conditions are unsuitable.

A minimum of three 3.0 meter x 3.0 meter on-site test plots shall be sprayed to determine the pigment color for the slurry. The Contracting Officer shall approve the pigment color prior to the Contractor beginning application on the project areas.

The plaster/cellulose fiber mulch stabilizer shall formulate a protective crust like barrier within 4 to 8 hours after application. Application of the plaster/cellulose fiber mulch stabilizer will not be permitted when weather conditions are unsuitable for concrete placement in accordance with Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

3.20.4 NO DUST PALLIATIVE/SOIL STABILIZER MIXED IN WITH F-4 DEBRIS BASIN EMBANKMENT MATERIALS

The Contractor shall not utilized any materials that have mixed into it Dust Palliative and/or Soil Stabilizer. Use of material containing Dust Palliative and/or Soil Stabilizer will be cause for rejection. The Contractor shall not utilize the Dust Palliative and/or Soil Stabilizer as a temporary dust control method unless directed in writting to do so by the Contracting Officer.

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DIVISION 02 - SITE WORK

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SECTION 02316

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2487	(2000) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996e1) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(2001) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4832	(2002) Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders

1.2 MEASUREMENT AND PAYMENT

No separate payment will be made for trench excavation and trench backfill for utilities. All costs in connection therewith shall be included in the contract prices for items to which the work applies.

1.3 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

CLSM Mixture Proportioning.

Controlled low-strength materials mixture proportion shall be determined by the Contractor and submitted for review. The mixture quantities of all ingredients per cubic meter shall be stated. Proportions shall indicate the mas of cement, pozzolan, water, aggregates (in saturated surface-dry condition), and the quantities of admixtures when used. The submission shall be accompanied by test reports from a laboratory complying in accordance with Section 03301, CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS, which show the proportions selected will produce the mixture indicated.

Testing Facilities; G, RE.

SD-06 Test Reports

Field Density Tests.

Testing of Backfill Materials.

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Satisfactory Materials

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC and CL.

2.1.2 Unsatisfactory Materials

NOTE - The term unsatisfactory materials and unsatisfactory soils are meant to be the same in this specification.

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also include but are not limited to those materials classified by ASTM D 2487 as CH, PT, OH, MH, ML, CL-ML, and OL and satisfactory material which contains root and other organic matter, and

materials too wet (unstable) to support construction equipment. The Contracting Officer shall be notified of any contaminated materials.

2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials shall include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM shall be identified as cohesionless only when the fines are nonplastic.

2.1.4 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 75 millimeters in any dimension or as defined by the pipe manufacturer, whichever is smaller.

2.1.5 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

2.1.6 Select Granular Material

Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a 0.075 mm mesh sieve and no less than 95 percent by weight passing the 25 mm sieve. The maximum allowable aggregate size shall be 50 millimeters, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

2.1.7 Initial Backfill Material

Initial backfill shall consist of select granular material or satisfactory materials free from rocks 50 millimeters or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 13 millimeters in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

2.1.8 Slurry Mix

Slurry mix shall be a Controlled Low Strength Material (CLSM) consisting of portland cement, fly ash, and fine or coarse aggregates or both, water, and/or admixtures. It shall have a minimum design compressive strength of 2 MPa at 28 days. Compressive strength testing shall be performed in accordance with ASTM D 4832. The mix shall have a slump in the range of 150 mm to 200 mm. Cementitious materials including portland cement and fly ash, aggregates, water, and/or admixtures shall be as specified in accordance with Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS. Contractor shall submit CLSM Mixture Proportioning to the Contracting Officer.

2.2 PLASTIC MARKING TAPE

Plastic marking tape shall be acid and alkali-resistant polyethylene film, 150 mm wide with minimum thickness of 0.100 mm. Tape shall have a minimum strength of 12.1 MPa lengthwise and 10.3 MPa crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 1 meter deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. Tape color shall be as specified in TABLE 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Yellow:	Gas, Oil, Dangerous Materials
Orange:	Telephone, Telegraph, Television, Police, and Fire Communications
Blue:	Water Systems
Green:	Sewer Systems

PART 3 EXECUTION

3.1 EXCAVATION

Excavation shall be performed to the lines and grades indicated. Excavation shall consist of the removal of every type of material encountered. The material to be removed may include but is not limited to hardpan, silt, sand, gravel, cobbles and boulders, cemented silt/sand/gravel/cobbles/boulders (cemented materials) with various degrees of cementation, caliche, rock, asphalt, vegetation, trash, and other debris. Excavation may require ripping or other rock-excavation techniques. Use of the heavy tractors equipped with a ripper tooth, hoe-rams, and hydraulic or pneumatic rock breaker could be necessary to excavate highly cemented soils. Rock or cemented material from required excavation to be used in compacted fills and backfills shall be crushed or otherwise reduced in size to meet gradation requirements prior to placement or stockpiling. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 600 mm. Excavated material not satisfactory for backfill shall become property of the contractor and removed from the project site. Excess (satisfactory) excavated materials shall be hauled, placed and compacted in the disposal site. Excess excavated materials including rocks and cemented soils shall be processed/crushed or otherwise reduced in sizes not exceeding 3/4 of the lift thickness, prior to hauling and placing in disposal site. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph BACKFILLING AND COMPACTION at no additional cost to the Government.

3.1.1 Trench Excavation Requirements

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than 1.5 meters high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Vertical trench walls more than 1.5 meters high shall be shored. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 600 mm plus pipe outside diameter (O.D.) for pipes of less than 600 mm inside diameter and shall not exceed 900 mm plus pipe outside diameter for sizes larger than 600 mm inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

3.1.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support. The trench subgrade shall not vary more than 13 millimeters from the indicated grade. Stones of 75 millimeters or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.1.1.2 Removal of Unyielding Material

Where overdepth is not indicated and unyielding material is encountered in the bottom of the trench, such material shall be removed 150 millimeters below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

3.1.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.1.1.4 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Loose disintegrated rock

and thin strata shall be removed. Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.1.1.5 Jacking, Boring, and Tunneling

Unless otherwise indicated, excavation shall be by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Contracting Officer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

3.1.2 Stockpiles

Stockpiles of satisfactory materials shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment, excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government. Locations of stockpiles of satisfactory materials shall be subject to prior approval of the Contracting Officer.

3.2 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required. Backfill shall be placed in layers not exceeding 150 mm loose thickness for compaction by hand operated machine compactors, and 200 mm loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 90 percent maximum density in accordance with ASTM D 1557.

3.2.1 Trench Backfill

Trenches shall be backfilled to the grade shown. The trench shall not be backfilled until all specified tests are performed.

3.2.1.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

3.2.1.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 150 mm loose thickness.

3.2.1.3 Bedding and Initial Backfill

Bedding material type and thickness shall be in accordance with pipe manufacturer recommendations. Initial backfill material shall consist of select granular material and shall be placed and compacted to 90 percent maximum density in accordance with ASTM D 1557 with approved tampers to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction, to 90 percent maximum density in accordance with ASTM D 1557, of the fill under the haunches of the pipe.

3.2.1.4 Final Backfill

The remainder of the trench shall be filled with satisfactory material and compacted to at least 90 percent maximum density in accordance with ASTM D 1557 except, top 1 meter under the roadways and maintenance roads shall be compacted to not less than 95% of maximum density per ASTM D 1557.

3.2.2 Backfill for Appurtenances

After the manhole, catch basin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for 14 days, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.2.3 Slurry Backfill

3.2.3.1 Placing

Slurry shall be placed by chutes, conveyors, pumps, or other methods approved by the Government. When used in trenches, the slurry shall be placed continuously. For open-ended applications, the end points shall be bulkheaded by earth dams or other means to contain the slurry. When used as backfill in the pipe zone, either for bedding and/or initial backfill, the slurry shall be placed in lifts to prevent floating and/or misaligning the pipe. Methods of preventing floatation include straps, soil anchors, or other approved means of restraint. When placing over the pipe (flexible wall) the slurry shall be placed in lifts to prevent collapsing the pipe. Each lift shall be allowed to harden before fresh slurry is placed over the pipe.

3.2.3.2 Time Interval Between Mixing and Placing

Slurry shall be placed within 30 minutes after discharge into nonagitating equipment. When slurry is truck-mixed, delivery and discharge of the slurry shall be completed within 1.5 hr after batching.

3.3 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the

specific utilities are as follows:

3.3.1 Gas Distribution

Trenches shall be excavated to a depth that will provide not less than 450 mm of cover in rock excavation and not less than 600 mm of cover in other excavation.

3.3.2 Water Lines

Trenches shall be of a depth to provide a minimum cover of 750 millimeters from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

3.3.3 Plastic Marking Tape

Warning tapes shall be installed directly above the pipe, at a depth of 450 millimeters below finished grade unless otherwise shown.

3.4 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

3.4.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. **The laboratory must be validated for the Corps of Engineers.** No work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer. The first inspection shall be at the expense of the Government. Cost incurred for any subsequent inspection required because of failure of the first inspection will be charged to the Contractor.

3.4.2 Testing of Backfill Materials

Classification of backfill materials shall be determined in accordance with ASTM D 2487 and the moisture-density relations of soils shall be determined in accordance with ASTM D 1557. A minimum of one soil classification and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

3.4.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test per lift of backfill for every 200 cubic meters of installation shall be performed. One moisture density relationship shall be determined for every 500 cubic meters of material used. Field in-place density shall be determined in accordance with ASTM D 1556. **Determination of in-place densities using the nuclear method ASTM D 2922 may be used to supplement the sand cone density tests ASTM D 1556. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in**

ASTM D 1556. ASTM D 2922 results in a wet unit weight of soil and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D 3017; the calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed by the Contracting Officer. At least one adjacent sand cone test with accompanying particle size analysis in accordance with ASTM D 422 shall be performed for every ten nuclear density tests performed. If field density tests determined by the nuclear method vary by more than 0.5 kilonewtons per cubic meter from comparison sand-cone tests, and are consistently high or low, adjustment of the calibration curve is necessary. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

3.4.4 Displacement of Sewers

After other required tests have been performed and the trench backfill compacted to 600 millimeters above the top of the pipe, the pipe shall be inspected to determine whether significant displacement has occurred. This inspection shall be conducted in the presence of the Contracting Officer. Pipe sizes larger than 900 mm shall be entered and examined, while smaller diameter pipe shall be inspected by shining a light or laser between manholes or manhole locations, or by the use of television cameras passed through the pipe. If, in the judgement of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, the defects shall be remedied as directed at no additional cost to the Government.

-- End of Section --

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SECTION 02700

SIDE DRAINS AND STORM DRAINAGE SYSTEMS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO M 198 (1998) Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets

ASTM INTERNATIONAL (ASTM)

ASTM A 48/A 48M	(2000) Gray Iron Castings
ASTM C 76	(2002) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 270	(2002) Mortar for Unit Masonry
ASTM C 443M	(2002) Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric)
ASTM C 655	(2002) Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe
ASTM C 789	(2000) Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
ASTM C 828	(2001) Low-Pressure Air Test of Vitrified Clay Pipe Lines
ASTM C 850	(2000) Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 2 Ft. of Cover Subjected to Highway Loadings
ASTM C 924M	(2002) Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method (Metric)
ASTM C 1103M	(2002) Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer

	Lines (Metric)
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM F 1417	(1992; R 1998) Installation Acceptance of Plastic Gravity Sewer Lines Using Low Pressure Air

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Placing Pipe.

Printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

SD-06 Test Reports

Pipeline Testing.

Certified copies of test reports demonstrating conformance to applicable pipe specifications, before pipe is installed.

SD-07 Certificates

Frame and Cover for Gratings.

Certification on the ability of frame and cover or gratings to carry the imposed live load.

1.3 DELIVERY, STORAGE, AND HANDLING OF MATERIALS.

1.3.1 Delivery and Storage.

Materials delivered to site shall be inspected for damage, unloaded, and stored with the minimum of handling. Do not store materials directly on the ground. Inside of pipes and fittings shall be kept free of dirt and debris. Gasket materials and plastic materials shall be protected from exposure to the direct sunlight over extended periods.

1.3.2 Handling.

Materials shall be handled in such a manner as to insure delivery to the trench in sound undamaged condition. Pipe shall be carried to the trench not dragged.

PART 2 PRODUCTS.

2.1 PIPE FOR SIDE DRAINS.

Pipe for side drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Concrete Pipe.

Concrete pipe shall conform to ASTM C 76, Class IV or to ASTM C 655 with a D-Load equal to or greater than that indicated to produce a 0.3 mm crack.

2.2 MISCELLANEOUS MATERIALS.

2.2.1 Concrete.

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 25 Mpa (4,000 psi) concrete under Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE.

2.2.2 Joints.

2.2.2.1 Mortar joints.

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C 270, Type M, except the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar. Water shall be clean and free of harmful acids, alkalies, and organic impurities.

The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.2.2.2 Flexible Watertight Joints For Concrete Pipe.

Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe. The design of joints and the physical requirements for plastic gaskets shall conform to AASHTO M 198, and rubber-type gaskets shall conform to ASTM C 443M. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are permitted if the nominal diameter of the pipe being gasketed exceeds 1.35 meters.

Flexible watertight joints for concrete pipe that are successfully installed shall then have a mortar joint installed per paragraph mortar joints.

2.2.3 DRAINAGE STRUCTURES

2.2.3.1 Precast Reinforced Concrete Drop Inlet Structure

Precast reinforced concrete drop inlet structure shall be in accordance with the type as shown on drawing sheets.

2.2.3.2 Precast Reinforced Concrete Box

For highway loadings with 600 mm of cover or more or subjected to dead load only, ASTM C 789; for less than 600 mm of cover subjected to highway loading, ASTM C 850.

2.2.4 Frame and Cover for Gratings

Frame and cover for gratings shall be cast gray iron, ASTM A 48/A 48M, Class 35B. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the plans.

PART 3 EXECUTION.

3.1 EXCAVATION FOR PIPE SIDE DRAINS AND DRAINAGE STRUCTURES.

Excavation of trenches and for appurtenances and backfilling for culverts and storm drains shall be in accordance with the applicable portions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS and the requirements specified below.

3.1.1 Trenching.

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 300 mm to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing where required shall be placed within the trench width as specified. Care shall be taken not to overexcavate.

3.1.2 REMOVAL OF ROCK.

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 200 mm or 85 mm for each meter of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Unless otherwise specified, material used to replace unstable material or rock excavation should be compacted to a minimum density of 90 percent, as determined by ASTM D 1557. Rock excavation shall be as specified and defined in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.1.3 Removal of Unstable Material.

Where wet or otherwise unstable soil incapable of properly supporting the

pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph REMOVAL OF ROCK. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the government.

3.2 BEDDING.

3.2.1 Concrete Pipe.

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. When no bedding class is specified or detailed on the drawings, concrete pipe shall be bedded carefully in a soil foundation accurately shaped and rounded to conform to the lowest one-fourth of the outside portion of circular pipe or to the lower curved portion of pipe arch for the entire length of the pipe or pipe arch. When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall be only of such length, depth, and width as required for properly making the particular type of joint.

3.3 PLACING PIPE.

Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall be inspected before backfilling, and those pipes damaged during placement shall be removed and replaced at no cost to the Government.

3.3.1 Concrete Pipe.

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.4 JOINTS.

3.4.1 Cement-Mortar Bell-and-Spigot Joint.

The first pipe shall be bedded to the established gradeline, with the bell end placed upstream. The interior surface of the bell shall be carefully cleaned with a wet brush and the lower portion of the bell filled with mortar to such depth as to bring inner surfaces of abutting pipes flush and even. The spigot end of each subsequent pipe shall be cleaned with a wet brush and uniformly matched into a bell so that sections are closely fitted. After each section is laid, the remainder of the joint shall be filled with mortar, and a bead shall be formed around the outside of the joint with sufficient additional mortar. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint

shall be wrapped or bandaged with cheesecloth to hold mortar in place.

3.4.2 Cement-Mortar Tongue-and-Groove Joint.

The first pipe shall be bedded carefully to the established gradeline with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint and filled with mortar to provide a bed for the pipe. The grooved end of the first pipe shall be carefully cleaned with a wet brush, and a layer of soft mortar applied to the lower half of the groove. The tongue of the second pipe shall be cleaned carefully with a wet brush; while in horizontal position, a layer of soft mortar shall be applied to the upper half of the tongue. The tongue end of the second pipe then shall be inserted in the grooved end of the first pipe until mortar is squeezed out on interior and exterior surfaces. Sufficient mortar shall be used to fill the joint completely and to form a bead on the outside.

3.4.3 Flexible Watertight Joints For Concrete Pipe.

Flexible watertight plastic or rubber gasketed joints may be used in lieu of other type of joints. Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe and the joint pushed home. If, while the joint is being made, the gasket becomes visibly dislocated, the pipe shall be removed and the joint remade.

The gasketed joint assembly area shall receive a layer of soft mortar on both the inside and on the outside, with the soft mortar being worked into the joint recesses. Sufficient mortar shall be used to fill the joint recesses completely and to form a bead on the outside.

3.5 SIDE DRAIN.

3.5.1 Side Drain Junction Structures.

Side drain pipes and stubout pipes shall join the outlet channel with junction structures. Construction of junction structures shall be of reinforced concrete complete as shown on the drawings.

3.6 DRAINAGE STRUCTURES

3.6.1 Inlets

Construction shall be of reinforced concrete or precast reinforced concrete; complete with frames and covers or gratings, per details shown on drawing sheets. Pipe connections to concrete inlets shall be made with flexible, watertight connectors.

3.7 BACKFILLING.

Backfilling of trenches for culverts and storm drains and backfilling for appurtenances shall be in accordance with the applicable portions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS and the requirements specified below.

3.7.1 Backfilling Pipe in Trenches.

After the bedding has been prepared and the pipe installed, selected material from the required excavation at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 150 mm in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Care shall be taken to insure thorough compaction of the fill under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 600 mm above the top of the pipe.

The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 150 mm and compacted to not less than 90 percent, of maximum density ASTM D 1557. In place densities shall be determined using ASTM D 1556. Where it is necessary in the opinion of the Contracting Officer, any sheeting and/or portions of bracing used shall be left in place, and the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.7.2 Backfilling Pipe in Fill Sections.

For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified above. The fill material shall be uniformly spread in layers longitudinally on both sides of pipe, not exceeding 150 mm in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 300 mm above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 4 meters, whichever is less.

3.7.3 Movement of Construction Machinery.

Operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of the construction shall be at the Contractor's risk. Any pipe damaged thereby shall be repaired or replaced at the expense of the Contractor.

3.8 PIPELINE TESTING

Lines shall be tested for leakage by low pressure air or water testing or exfiltration tests, as appropriate. Low pressure air testing for concrete pipes shall conform to ASTM C 924M. Low pressure air testing for plastic pipe shall conform to ASTM F 1417. Low pressure air testing procedures for other pipe materials shall use the pressures and testing times prescribed in ASTM C 828 or ASTM C 924M, after consultation with the pipe

manufacturer. Testing of individual joints for leakage by low pressure air or water shall conform to ASTM C 1103M. Prior to exfiltration tests, the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection.

Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 600 mm or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Contracting Officer. An exfiltration test shall be made by filling the line to be tested with water so that a head of at least 600 mm is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be reestablished. The amount of water required to maintain this water level during a 2-hour test period shall be measured.

Leakage as measured by the exfiltration test shall not exceed 60 liters per mm in diameter per kilometer (250 gallons per inch in diameter per mile) of pipeline per day or 9 mL per mm in diameter per 100 meters (0.2 gallons per inch in diameter per 100 feet) of pipeline per hour. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correcting, and retesting shall be made at no additional cost to the Government.

3.9 Temporary Capping or Temporary Plugging of Side Drain Pipes

New side drain pipes that are not connected to existing drainage structures and/or existing pipes shall be temporarily plugged or temporarily capped in accordance with drawings, and the end shall be surveyed and the Channel Station and side drain pipe end (capped or plugged) Northing/ Easting/ Elevation information shall be provided in writing to the Contracting Officer. If there are no details for plugging or capping the side drain pipe, the Contractor shall cap or plug side drain pipe with flat sheet of 25.4 mm plywood covering pipe opening and extending a minimum of 610 mm on all sides of pipe exterior surface.

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SECTION 02741

HOT-MIX ASPHALT (HMA) FOR ROADS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASPHALT INSTITUTE (AI)

AI MS-02 (6th Edition; R 1997) Mix Design Methods
for Asphalt

ASTM INTERNATIONAL (ASTM)

ASTM C 117 (1995) Materials Finer Than 75 micrometer
(No. 200) Sieve in Mineral Aggregates by
Washing

ASTM C 131 (2001) Resistance to Degradation of
Small-Size Coarse Aggregate by Abrasion
and Impact in the Los Angeles Machine

ASTM C 136 (2001) Sieve Analysis of Fine and Coarse
Aggregates

ASTM C 150 (2002a) Portland Cement

ASTM C 566 (1997) Total Evaporable Moisture Content
of Aggregate by Drying

ASTM D 140 (2001) Sampling Bituminous Materials

ASTM D 422 (1963; R 1998) Particle-Size Analysis of
Soils

ASTM D 995 (1995b; R 2002) Mixing Plants for
Hot-Mixed, Hot-Laid Bituminous Paving
Mixtures

ASTM D 1461 (1985; R 2001) Moisture or Volatile
Distillates in Bituminous Paving Mixtures

ASTM D 1559 (1989) Resistance to Plastic Flow of
Bituminous Mixtures Using Marshall
Apparatus

ASTM D 2489 (2002) Estimating Degree of Particle

Coating of Bituminous-Aggregate Mixtures

ASTM D 2950	(1991; R 1997) Density of Bituminous Concrete in Place by Nuclear Method
ASTM D 3381	(1992; R 1999) Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D 3666	(2002) Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4867/D 4867M	(1996) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D 5444	(1998) Mechanical Size Analysis of Extracted Aggregate

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION (NDOT), MATERIALS TESTING DIVISION

NDOT T230C	(Rev C) Method of Test For Determining the Percent of Fractured Faces
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1.2 DESCRIPTION OF WORK

The work shall consist of pavement courses composed of mineral aggregate and asphalt material heated and mixed in a central mixing plant and placed on a prepared course. HMA designed and constructed in accordance with this section shall conform to the lines, grades, thicknesses, and typical cross sections shown on the drawings. Each course shall be constructed to the depth, section, or elevation required by the drawings and shall be rolled, finished, and approved before the placement of the next course.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Quality Control Plan for hot-mix asphalt; G, RE.

The Contractor shall develop an approved Quality Control Plan for hot-mix asphalt. Hot-mix asphalt for payment shall not be produced until the quality control plan has been approved.

SD-03 Product Data

Waybills and Delivery Tickets.

Waybills and delivery tickets submitted during progress of the work.

SD-04 Samples

Asphalt Cement Binder.

Samples of the asphalt cement binder specified shall be submitted for approval not less than 14 days before start of the test section.

SD-05 Design Data

Bituminous Pavement Mix Design; G, RE.

Copy of Mix Design selected. Report to be submitted and signed by a Civil Engineer Licensed to Practice in the State of Nevada.

Job Mix Formula; G, RE.

Properties of Bituminous Pavement Mixture; G, RE.

The job mix formula and properties of bituminous pavement mixture shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of paving operations.

SD-06 Test Reports

Asphalt Content.

Aggregate Gradation.

Aggregate Moisture.

Temperatures.

Moisture Content of Mixture.

Laboratory Air Voids, Marshall Stability and Flow.

In-place Density.

Thickness.

Grade Conformance and Surface Smoothness.

Copies of test results. Reports to be submitted and signed by a Civil Engineer Licensed to Practice in the State of Nevada.

Asphalt Cement Binder.

Copies of test data indicating grade certification shall be provided by the supplier at the time of delivery of each load to the mix plant. Copies of these certifications shall be submitted to the Contracting Officer.

Aggregates.

All aggregate test results and samples shall be submitted to the Contracting Officer at least 14 days prior to start of construction.

QC Monitoring.

QC test results.

SD-07 Certificates

Testing Laboratory; G, RE.

Certification of compliance.

Plant Scale Calibration Certification.

Certificate of the testing laboratory, certification of compliance, and plant scale calibration certification.

1.4 ASPHALT MIXING PLANT

Plants used for the preparation of hot-mix asphalt shall conform to the requirements of ASTM D 995 with the following changes:

- a. Truck Scales. The asphalt mixture shall be weighed on approved certified scales at the Contractor's expense. Scales shall be inspected and sealed at least annually by an approved calibration laboratory. The plant scale shall have a valid plant scale calibration certification.
- b. Testing Facilities. The Contractor shall provide all necessary laboratory facilities for the Contractor's quality control testing and use of the Government for acceptance testing, as necessary.
- c. Inspection of Plant. The Contracting Officer shall have access at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; checking the temperatures maintained in the preparation of the mixtures and for taking samples. The Contractor shall provide assistance as requested, for the Government to procure any desired samples.
- d. Storage Bins. Use of storage bins for temporary storage of hot-mix asphalt will be permitted as follows:
 - (1) The asphalt mixture may be stored in non-insulated storage bins for a period of time not exceeding 3 hours.
 - (2) The asphalt mixture may be stored in insulated storage bins for a period of time not exceeding 8 hours. The mix drawn from bins shall meet

the same requirements as mix loaded directly into trucks.

1.5 HAULING EQUIPMENT

Trucks used for hauling hot-mix asphalt shall have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other approved material. Petroleum based products shall not be used as a release agent. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers (tarps) shall be securely fastened.

1.6 ASPHALT PAVERS

Asphalt pavers shall be self-propelled, with an activated screed, heated as necessary, and shall be capable of spreading and finishing courses of hot-mix asphalt which will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed without segregation. The screed shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

1.7 ROLLERS

Rollers shall be in good condition and shall be operated at slow speeds to avoid displacement of the asphalt mixture. The number, type, and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. Equipment which causes excessive crushing of the aggregate shall not be used.

1.8 STRAIGHTEDGE

The Contractor shall furnish and maintain at the site, in good condition, one 3.66 m straightedge for each bituminous paver. Straightedge shall be made available for Government use. Straightedges shall be constructed of aluminum or other lightweight metal and shall have blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement on pavement.

1.9 GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS

Finished surface of bituminous courses shall conform to gradeline and elevations shown and to surface smoothness requirements specified.

1.9.1 Plan Grade

The grade of the completed surface shall not deviate more than 15.2 mm from

the plan grade.

1.9.2 Surface Smoothness

When a 3.66 m straightedge is laid on the surface parallel with the centerline of the paved area or transverse from crown to pavement edge, the surface shall vary not more than 6.4 mm from the straightedge.

1.10 GRADE CONTROL

Lines and grades shall be established and maintained by means of line and grade stakes placed at site of work. Elevations of bench marks used by the Contractor for controlling pavement operations at the site of work will be determined, established, and maintained by the Government. Finished pavement elevations shall be established and controlled at the site of work by the Contractor in accordance with bench mark elevations furnished by the Contracting Officer.

1.11 WEATHER LIMITATIONS

The hot-mix asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 1. The temperature requirements may be waived by the Contracting Officer, if requested; however, all other requirements, including compaction, shall be met.

Table 1. Surface Temperature Limitations of Underlying Course

<u>Mat Thickness, mm</u>	<u>Degrees C</u>
75 or greater	4
Less than 75	7

PART 2 PRODUCTS

2.1 AGGREGATES

Aggregates shall consist of stone, crushed stone, gravel, crushed gravel, screenings, natural sand and mineral filler, as required. The portion of material retained on the 4.75 mm sieve is coarse aggregate. The portion of material passing the 4.75 mm sieve and retained on the 0.075 mm sieve is fine aggregate. The portion passing the 0.075 mm sieve is defined as mineral filler. All aggregate test results and samples shall be submitted to the Contracting Officer at least 14 days prior to start of construction.

2.1.1 Coarse Aggregate

Coarse aggregate shall consist of sound, tough, durable particles, free from films of material that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. All individual coarse aggregate sources shall meet the following requirements:

a. The percentage of loss shall not be greater than 45 percent after 500 revolutions when tested in accordance with ASTM C 131.

b. The portion of the material larger than the 10 mm screen shall contain at least 75 percent particles having fractured faces when tested in accordance with NDOT T230C.

2.1.2 Fine Aggregate

Fine aggregate shall consist of clean, sound, tough, durable particles. The aggregate particles shall be free from coatings of clay, silt, or any objectionable material and shall contain no clay balls. Fine aggregate shall have a plasticity index of 6 percent or less and a liquid limit of 35 percent or less when tested in accordance with ASTM D 4318.

2.1.3 Mineral Filler

Mineral filler shall consist of Portland cement conforming to ASTM C 150 or shall be mechanically reduced rock with the following gradation.

<u>Grain size (mm)</u>	<u>Percent Finer</u>
0.075	75-100
0.05	65-100
0.02	35-65
0.01	26-35
0.005	10-22

Grain size shall be determined in accordance with ASTM D 422.

2.1.4 Aggregate Gradation

2.1.4.1 Maintenance Road

The combined aggregate gradation shall conform to the gradation specified in Table 2, when tested in accordance with ASTM C 136 and ASTM C 117, and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grade uniformly from coarse to fine.

Table 2. Aggregate Gradation

<u>Sieve Size, mm</u>	<u>Percent Passing by Mass</u>
25	100
19	90-100
12.5	78-94
9.5	68-84
4.75	50-65
2.36	30-49
0.30	7-25
0.075	2-9

2.1.4.2 Arterial, Detour and Replacement Roads

The gradation and quality of asphalt aggregate shall conform to those normally used locally in the construction of roadways by either State (NDOT) or County Public Works agencies.

2.2 ASPHALT CEMENT BINDER

Asphalt cement binder for use in maintenance road shall conform to ASTM D 3381 Table 2, Viscosity Grade AC-40. **Asphalt cement for arterial, detour and replacement roads shall conform to either State (NDOT) or County Public Works requirements.** Test data indicating grade certification shall be provided by the supplier at the time of delivery of each load to the mix plant. Copies of these certifications shall be submitted to the Contracting Officer. The supplier is defined as the last source of any modification to the binder. The Contracting Officer may sample and test the binder at the mix plant at any time before or during mix production. Samples for this verification testing shall be obtained by the Contractor in accordance with ASTM D 140 and in the presence of the Contracting Officer. These samples shall be furnished to the Contracting Officer for the verification testing, which shall be at no cost to the Contractor.

2.3 MIX DESIGN

The Contractor shall develop the bituminous pavement mix design. The asphalt mix shall be composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt material. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF). No hot-mix asphalt for payment shall be produced until a JMF has been approved. The hot-mix asphalt shall be designed using procedures contained in AI MS-02 and the criteria shown in Table 3. If the Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D 4867/D 4867M is less than 75, the aggregates shall be rejected or the asphalt mixture treated with an approved anti-stripping agent. The amount of anti-stripping agent added shall be sufficient to produce a TSR of not less than 75. If an antistrip agent is required, it shall be provided by the Contractor at no additional cost. Sufficient materials to produce 90 kg of blended mixture shall be provided to the Contracting Officer for verification of mix design at least 14 days prior to the start of construction.

2.3.1 JMF Requirements

The job mix formula and properties of bituminous pavement mixture shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of paving operations and shall include as a minimum:

- a. Percent passing each sieve size.
- b. Percent of asphalt cement.

- c. Percent of each aggregate and mineral filler to be used.
- d. Asphalt viscosity grade.
- e. Number of blows of hammer per side of molded specimen.
- f. Laboratory mixing temperature.
- g. Lab compaction temperature.
- h. Temperature-viscosity relationship of the asphalt cement.
- i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.
- j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-02.
- k. Specific gravity and absorption of each aggregate.
- l. Percent natural sand.
- m. Percent particles with 2 or more fractured faces (in coarse aggregate).
- n. Fine aggregate angularity.
- o. Tensile Strength Ratio (TSR).
- p. Antistrip agent (if required) and amount.
- q. List of all modifiers and amount used.

Table 3. Marshall Design Criteria

<u>Test Property</u>	<u>50 Blow Mix</u>
Stability, newtons minimum	*4450
Flow, 0.25 mm	8-18
Air voids, percent	3-5
TSR, minimum percent	75

* This is a minimum requirement. The average during construction shall be significantly higher than this number to ensure compliance with the specifications.

2.3.2 Adjustments to Field JMF

The Laboratory JMF for each mixture shall be in effect until a new formula is approved in writing by the Contracting Officer. Should a change in sources of any materials be made, a new laboratory design shall be performed and a new JMF approved before the new material is used. The Contractor will be allowed to adjust the Laboratory JMF within the limits specified below to optimize mix volumetric properties with the approval of the Contracting Officer. Adjustments to the Laboratory JMF shall be applied to the field (plant) established JMF and limited to those values as shown. Adjustments shall be targeted to produce or nearly produce 4 percent voids total mix.

Table 4. Field (Plant) Established JMF Tolerances
Sieves Adjustments (plus or minus), percent

12.5 mm	3
4.75 mm	3
2.36 mm	3
0.075 mm	1
Binder Content	0.4

If adjustments are needed that exceed these limits, a new mix design shall be developed. Tolerances given above may permit the aggregate grading to be outside the limits shown in Table 2; while not desirable, this is acceptable.

PART 3 EXECUTION

3.1 PREPARATION OF ASPHALT BINDER MATERIAL

The asphalt cement material shall be heated avoiding local overheating and providing a continuous supply of the asphalt material to the mixer at a uniform temperature. The temperature of unmodified asphalts shall be no more than 160 degrees C when added to the aggregates. Modified asphalts shall be no more than 174 degrees C when added to the aggregates.

3.2 PREPARATION OF MINERAL AGGREGATE

The aggregate for the mixture shall be heated and dried prior to mixing. No damage shall occur to the aggregates due to the maximum temperature and rate of heating used. The temperature of the aggregate and mineral filler shall not exceed 175 degrees C when the asphalt cement is added. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

3.3 PREPARATION OF HOT-MIX ASPHALT MIXTURE

The aggregates and the asphalt cement shall be weighed or metered and introduced into the mixer in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of

asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but no less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D 2489, for each individual plant and for each type of aggregate used.

The wet mixing time will be set to at least achieve 95 percent of coated particles. The moisture content of all hot-mix asphalt upon discharge from the plant shall not exceed 0.5 percent by total weight of mixture as measured by ASTM D 1461.

3.4 PREPARATION OF THE UNDERLYING SURFACE

The underlying surface shall be maintained in suitable condition for the placement of asphaltic pavement. Immediately before placing the hot mix asphalt, the underlying course shall be cleaned of dust and debris. The surface of the base course will be inspected for adequate compaction and surface tolerances specified in paragraph: GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS. Unsatisfactory areas shall be corrected, prior to commencement of asphaltic pavement lay down operations.

3.5 TESTING LABORATORY

The laboratory used to develop the JMF shall meet the requirements of ASTM D 3666. A certification signed by the manager of the laboratory stating that it meets these requirements or clearly listing all deficiencies shall be submitted to the Contracting Officer prior to the start of construction.

The certification shall contain as a minimum:

- a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.
- b. A listing of equipment to be used in developing the job mix.
- c. A copy of the laboratory's quality control system.
- d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program.

3.6 TRANSPORTING AND PLACING

3.6.1 Transporting

The hot-mix asphalt shall be transported from the mixing plant to the site in clean, tight vehicles. Deliveries shall be scheduled so that placing and compacting of mixture is uniform with minimum stopping and starting of the paver. Adequate artificial lighting shall be provided for night placements. Hauling over freshly placed material will not be permitted until the material has been compacted as specified, and allowed to cool to 60 degrees C. To deliver mix to the paver, the Contractor shall use a material transfer vehicle which shall be operated to produce continuous forward motion of the paver. Waybills and delivery tickets are to be submitted with each load.

3.6.2 Placing

The mix shall be placed and compacted at a temperature suitable for obtaining density, surface smoothness, and other specified requirements. Upon arrival, the mixture shall be placed to the full width by an asphalt paver; it shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Unless otherwise permitted, placement of the mixture shall begin along the centerline of a crowned section or on the high side of areas with a one-way slope. The mixture shall be placed in consecutive adjacent strips having a minimum width of 3 m. The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 300 mm; however, the joint in the surface course shall be at the centerline of the pavement. Transverse joints in one course shall be offset by at least 3 m from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 3 m. On isolated areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread and luted by hand tools.

3.7 COMPACTION OF MIXTURE

After placing, the mixture shall be thoroughly and uniformly compacted by rolling. The surface shall be compacted as soon as possible without causing displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once. Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross section, and the required field density is obtained. After the Contractor is assured of meeting grade and smoothness requirements, rolling shall be continued until all roller marks are eliminated and at least 95 percent of the laboratory maximum density has been achieved. To prevent adhesion of the mixture to the roller, the wheels shall be kept properly moistened but excessive water will not be permitted. In areas not accessible to the roller, the mixture shall be thoroughly compacted with hand tampers. Any mixture that becomes loose and broken, mixed with dirt, contains check-cracking, or is in any way defective shall be removed full depth, replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching will not be allowed.

3.8 JOINTS

The formation of joints shall be made ensuring a continuous bond between the courses and to obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

3.8.1 Transverse Joints

The roller shall not pass over the unprotected end of the freshly laid mixture, except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing material at the joint. The cutback material shall be removed from the project. In both methods, all contact surfaces shall be given a light tack coat of asphalt material before placing any fresh mixture against the joint.

3.8.2 Longitudinal Joints

Longitudinal joints which are irregular, damaged, uncompacted, cold (less than 80 degrees C at the time of placing adjacent lanes), or otherwise defective, shall be cut back a minimum of 50 mm from the edge with a cutting wheel to expose a clean, sound vertical surface for the full depth of the course. All cutback material shall be removed from the project. All contact surfaces shall be given a light tack coat of asphalt material prior to placing any fresh mixture against the joint. The Contractor will be allowed to use an alternate method if it can be demonstrated that density, smoothness, and texture can be met.

3.9 CONTRACTOR QUALITY CONTROL

3.9.1 General Quality Control Requirements

The Contractor shall develop an approved Quality Control Plan for hot-mix asphalt. Hot-mix asphalt for payment shall not be produced until the quality control plan has been approved. The plan shall address all elements which affect the quality of the pavement including, but not limited to:

- a. Mix Design
- b. Aggregate Grading
- c. Quality of Materials
- d. Stockpile Management
- e. Proportioning
- f. Mixing and Transportation
- g. Mixture Volumetrics
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- i. Placing and Finishing
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l. Surface Smoothness

3.9.2 Testing Laboratory

The Contractor shall have access to a fully equipped asphalt laboratory. The laboratory shall meet the requirements as required in ASTM D 3666. Laboratory facilities shall be kept clean and all equipment shall be maintained in proper working condition. The Contracting Officer shall be permitted unrestricted access to inspect the Contractor's laboratory facility, to witness quality control activities, and to perform any check testing desired. The Contracting Officer will advise the Contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When, in the opinion of the Contracting Officer, the deficiencies are serious enough to adversely affect test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are corrected.

3.9.3 Quality Control Testing

The Contractor shall perform all quality control tests applicable to these specifications and as set forth in the Quality Control Program. The testing program shall include, but shall not be limited to, tests for the control of asphalt content, aggregate gradation, aggregate moisture, temperatures, moisture content of mixture, laboratory air voids, Marshall stability and flow, in-place density, thickness, grade conformance and surface smoothness. A Quality Control Testing Plan shall be developed as part of the Quality Control Program.

3.9.3.1 Asphalt Content

A minimum of one test to determine asphalt content will be performed per 500 metric tons of asphaltic concrete produced.

3.9.3.2 Aggregate Gradation

Aggregate gradations shall be determined for each 250 metric tons of asphaltic concrete produced from mechanical analysis of recovered aggregate in accordance with ASTM D 5444. For batch plants, aggregates shall be tested in accordance with ASTM C 136 using actual batch weights to determine the combined aggregate gradation of the mixture.

3.9.3.3 Aggregate Moisture

The moisture content of aggregate used for production shall be determined a minimum of once per shift in accordance with ASTM C 566.

3.9.3.4 Temperatures

At least one measurement of asphaltic concrete temperature shall be taken in each hour, in which paving operations are being conducted. Additional tests at additional locations, to determine the temperature at the dryer,

the asphalt cement in the storage tank, the asphalt mixture at the plant, and the asphalt mixture at the job site, may be required as directed by the Contracting Officer.

3.9.3.5 Moisture Content of Mixture

The moisture content of the mixture shall be determined at least once per shift in accordance with ASTM D 1461 or an approved alternate procedure.

3.9.3.6 Laboratory Air Voids, Marshall Stability and Flow

Mixture samples shall be taken at least once per 1000 metric tons and compacted into specimens, using 50 blows per side with the Marshall hammer as described in ASTM D 1559. After compaction, the laboratory air voids of each specimen shall be determined, as well as the Marshall stability and flow.

3.9.3.7 In-Place Density

At least three cores will be recovered and tested for every 1000 square meters of pavement, or one day's production, whichever is smaller. Additional tests may be taken as required by the Contracting Officer. The Contractor may conduct any additional necessary testing to ensure the specified density is achieved. A nuclear gauge may be used to monitor pavement density in accordance with ASTM D 2950. Record sampling will be by use of cores as indicated above.

3.9.3.8 Thickness

At least three cores will be recovered and tested for every 1000 square meters of pavement, or one day's production, whichever is smaller. Additional tests may be taken as required by the Contracting Officer.

3.9.3.9 Grade Conformance and Surface Smoothness

The Contractor shall conduct the necessary checks to ensure the grade and smoothness requirements are met in accordance with paragraph GRADE AND SURFACE SMOOTHNESS REQUIREMENTS.

3.9.3.10 Additional Testing

Any additional testing, which the Contractor deems necessary to control the process, may be performed at the Contractor's option.

3.9.3.11 QC Monitoring

The Contractor shall submit all QC test results to the Contracting Officer on a daily basis as the tests are performed. The Contracting Officer reserves the right to monitor any of the Contractor's quality control testing and to perform duplicate testing as a check to the Contractor's quality control testing. At the completion of asphalt work the Contractor shall submit a certification of compliance indicating that the work is in compliance with this section.

3.9.4 Action Required

3.9.4.1 Asphalt Content

If there is a failure to meet the specified asphalt content production will cease and the Contracting Officer will be immediately notified. No additional paving will occur until adjustments to the plant and test results confirm that the specified asphalt is being supplied.

3.9.4.2 Aggregate Gradation

When the amount passing any sieve is outside the specification limits, the aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation.

3.9.4.3 Aggregate Moisture Content

When the moisture content of the aggregates is outside specification requirements the aggregates shall be immediately resampled and retested. If there is another failure, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation.

3.9.4.4 Temperature

When the temperature of the bituminous mixture is outside specification requirements the mixture shall be immediately resampled and retested. If there is another failure, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation. In no case will overheated or carbonized mixtures be allowed.

3.9.4.5 Asphalt Properties

If there is a failure in any of the asphalt properties production will cease and the Contracting Officer will be immediately notified. No additional paving will occur until adjustments to the plant and test results confirm that the specified properties are being achieved.

3.9.4.6 Density

When test results indicate lack of compaction additional specimens will be obtained as directed by the Contracting Officer. Based on the test results the Contractor will remove and replace the affected areas of pavement.

3.9.4.7 Thickness

When test results indicate that the finished pavement is 6 mm less than the thickness shown on the drawings, additional samples will be taken to determine the extent of defective thickness. The area determined will be removed and replaced or may be overlaid. The overlay will be a minimum of 25 mm thick and will be placed to duplicate slopes and drainages of the original pavement. No skin patching will be allowed.

3.9.5 Sampling

When directed by the Contracting Officer, the Contractor shall sample and test any material which appears inconsistent with similar material being produced, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

3.9.6 Reports

All results of tests conducted shall be reported as required. During periods requiring protection from weather, reports of pertinent temperatures or other relevant values shall be made daily. These requirements do not relieve the contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all Contractor Quality Control records.

3.10 Waybills and Delivery Tickets

Copies of waybills or delivery tickets shall be submitted to the Contracting Officer's Representative, during the progress of the work. The Contractor shall furnish the Contracting Officer's Representative scale tickets for each load of material weighed; these tickets shall include tare weight, identification mark of each vehicle weighed, plus date, time, and location of the loading. Tickets shall be furnished at the point and time individual loads arrive at the work site. A master log of all vehicle loading shall be furnished for each day of loading operation. The Contractor shall file with the Contracting Officer's Representative the master log of loadings, certified waybills and/or certified tickets, within 24 hours of material delivery. Prior to the final payment, the Contractor shall furnish written certification that the material recorded on the submitted waybills and/or certified tickets was actually used in the construction covered by the contract.

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SECTION 02821

FENCING AND RAILING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A 116	(2000) Metallic-Coated, Steel Woven Wire Fence Fabric
ASTM A 123/A 123M	(2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153/A 153M	(2001a) Zinc Coating (Hot Dip) on Iron and Steel Hardware
ASTM A 392	(1996) Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 475	(1998) Zinc-Coated Steel Wire Strand
ASTM A 491	(1996) Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A 501	(1999) Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A 780	(2001) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 824	(2001) Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence
ASTM B 32	(2000e1) Solder Metal
ASTM C 94/C 94M	(2000e2) Ready-Mixed Concrete
ASTM C 270	(2002) Mortar for Unit Masonry
ASTM C 476	(1999) Grout for Masonry
ASTM F 626	(1996a) Fence Fittings
ASTM F 883	(1997) Padlocks

ASTM F 900	(2000) Industrial and Commercial Swing Gates
ASTM F 1043	(2000) Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework
ASTM F 1083	(1997) Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM F 1184	(1994; R 2000) Industrial and Commercial Horizontal Slide Gates

UNDERWRITERS LABORATORIES (UL)

UL 467	(1993; Rev thru Aug 2001) Grounding and Bonding Equipment
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1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Post and Cable Railing System.

Chain Link Metal Fence and Gates.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: Post and Cable railing system, chain link metal fences and gates.

SD-07 Certificates

Chain Link Fence.

Statement, signed by an official authorized to certify on behalf of the manufacturer, attesting that the chain link fence and component materials meet the specified requirements.

PART 2 PRODUCTS

2.1 FENCE FABRIC

Fence fabric shall conform to the following:

2.1.1 Chain Link Fence Fabric

ASTM A 392, Class 2, zinc-coated steel wire with minimum coating weight of 610 grams of zinc per square meter of coated surface, or ASTM A 491, Type I, aluminum-coated steel wire. Fabric shall be fabricated of 9 gauge wire woven in 50 mm mesh. In the event the plans or drawings indicate 11 gauge wire, the Contractor shall use 9 gauge wire as specified herein. Fabric height shall be 1.83 meters. Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.

2.1.2 TORTOISE FENCING

Tortoise fencing shall be temporary and shall consist of a 1.219 meter high, 1/2" galvanized mesh, or equivalent, with steel tee posts driven into the ground, or with steel tee posts set in excavated holes with mortar and grout as necessary, installed where shown on the drawings or required by the Contracting Officer. Mortar and grout to set steel tee posts in holes as necessary shall conform to ASTM C 270 Type M and ASTM C 476.

2.1.3 Woven Wire and Wire Netting

Woven wire shall conform to ASTM A 116 No. 12-1/2 close mesh fence; size as indicated. Wire netting shall conform to ASTM A 116 heavy grade; size as indicated.

2.2 GATES

ASTM F 900 and/or ASTM F 1184. Gate shall be the type and swing shown. Gate frames shall conform to strength and coating requirements of ASTM F 1083 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) 1-1/2. Gate frames shall conform to strength and coating requirements of ASTM F 1043, for Group IC, steel pipe with external coating Type A or Type B, nominal pipe size (NPS) 1-1/2. Gate fabric shall be as specified for chain link fabric. Gate leaves more than 2.44 m wide shall have either intermediate members and diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 2.44 m wide shall have truss rods or intermediate braces. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, stops, keepers, rollers, and other hardware items shall be furnished as required for the operation of the gate. Latches shall be arranged for padlocking so that the padlock will be accessible from both sides of the gate. Stops shall be provided for holding the gates in the open position.

2.3 METAL POSTS FOR CHAIN LINK FENCE, TORTOISE FENCE, AND POST AND CABLE RAILING

2.3.1 METAL POSTS FOR CHAIN LINK FENCE

ASTM F 1083, zinc-coated. Group IA, with external coating Type A steel pipe. Group IC steel pipe, zinc-coated with external coating Type A or Type B and Group II, formed steel sections, shall meet the strength and coating requirements of ASTM F 1043. Group III, ASTM F 1043 steel

H-section may be used for line posts in lieu of line post shapes specified for the other classes. Sizes shall be as shown on the drawings. Line posts and terminal (corner, gate, and pull) posts selected shall be of the same designation throughout the fence. Gate post shall be for the gate type specified subject to the limitation specified in ASTM F 900.

2.3.2 Metal Posts for Post and Cable Railing

Posts for Post and Cable Railing shall be per ASTM A 501 and shall be hot-dip galvanized after drilling holes, welding, and other fabrication as shown on the drawings. Galvanizing shall be in accordance with ASTM A 123/A 123M, as applicable. Welded, cut, damaged, and deformed areas of galvanizing metal shall be neatly coated with Grade 50B solder conforming to ASTM B 32.

2.3.3 Metal Tee Posts For Tortoise Fencing

Steel tee posts shall be similar to those found commercially available, adjusted to the height of the tortoise fence fabric.

2.4 BRACES AND RAILS

ASTM F 1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F 1043. Group II, formed steel sections, size 42 mm, conforming to ASTM F 1043, may be used as braces and rails if Group II line posts are furnished.

2.5 WIRE

2.5.1 Tension Wire

Tension wire shall be Type I or Type II, Class 2 coating, in accordance with ASTM A 824.

2.6 CABLES FOR POST AND CABLE RAILING

Cables shall be prestretched, galvanized wire rope of the size indicated, ungreased. Wire rope shall conform to ASTM A 475, high strength grade with Class A coating. Fittings and accessories shall be hot-dip galvanized.

2.7 ACCESSORIES

Fence fittings and accessories shall be per ASTM F 626 and as shown on the drawings. Ferrous accessories shall be zinc or aluminum coated. Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Tie wire for attaching fabric to rails, braces, and posts shall be 9 gauge steel wire and match the coating of the fence fabric. Miscellaneous hardware coatings shall conform to ASTM A 153/A 153M unless modified. For the Post and Cable Railing system the turnbuckles, eyebolts, anchors, u-bolt clips, nuts and washers shall be galvanized or zinc plated.

2.8 CONCRETE

ASTM C 94/C 94M, using 19 mm maximum size aggregate, and having minimum compressive strength of 21 MPa at 28 days. Grout shall consist of one part portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

2.9 PADLOCKS

Padlocks shall conform to ASTM F 883, Type PO1 Grade 2, Size 44 mm (1-3/4 inch). Padlocks shall be a combination commercial type Padlock Master #175 or equivalent.

2.10 GROUND RODS

Rods made of copper-clad steel shall conform to UL 467. Ground rods shall be not less than 19.1 mm (3/4 inch) in diameter and 3.048 m (10 feet) in length.

2.11 Grout for Post and Cable System

Grout shall consist of one part portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

PART 3 EXECUTION

3.1 INSTALLATION

Fence shall be installed to the lines and grades indicated. The area on either side of the fence line shall be cleared to the extent indicated. Line posts shall be spaced equidistant at intervals not exceeding 3 m. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts; however, runs between terminal posts shall not exceed 152.4 m. Any damage to galvanized surfaces, including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A 780.

3.2 EXCAVATION

Post holes shall be cleared of loose material. Waste material shall be spread where directed. The ground surface irregularities along the fence line shall be eliminated to the extent necessary to maintain a 50 mm clearance between the bottom of the fabric and finish grade.

3.3 POST INSTALLATION, CHAIN LINK METAL FENCE AND GATES

3.3.1 Posts for Chain Link Fence

Posts shall be set plumb and in alignment. Except where solid rock is encountered, posts shall be set in concrete to the depth indicated on the drawings. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 457 mm in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to the minimum depth indicated on the drawing unless a penetration of 457 mm in solid rock is achieved before reaching the indicated depth, in which case depth of

penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than the diameter shown on the drawings. Diameters of holes in solid rock shall be at least 25 mm greater than the largest cross section of the post. Concrete and grout shall be thoroughly consolidated around each post, shall be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Group II line posts may be mechanically driven, for temporary fence construction only, if rock is not encountered. Driven posts shall be set to a minimum depth of 914 mm and shall be protected with drive caps when being set.

3.4 RAILS

3.4.1 Top Rail

Top rail shall be supported at each post to form a continuous brace between terminal posts. Where required, sections of top rail shall be joined using sleeves or couplings that will allow expansion or contraction of the rail.

3.4.2 Bottom Rail

The bottom rail shall be bolted to double rail ends and double rail ends shall be securely fastened to the posts. Bolts shall be peened to prevent easy removal. Bottom rail shall be installed before chain link fabric.

3.5 BRACES AND TRUSS RODS

Braces and truss rods shall be installed as indicated and in conformance with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 1.83 m in height. A center brace or 2 diagonal truss rods shall be installed on 3.66 m fences. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 1.83 m high or less if a top rail is installed.

3.6 TENSION WIRES

Tension wires shall be installed along the top and bottom of the fence line and attached to the terminal posts of each stretch of the fence. Top tension wires shall be installed within the top 102 mm of the installed fabric. Bottom tension wire shall be installed within the bottom 152 mm of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

3.7 CHAIN LINK FABRIC

Chain link fabric shall be installed on the side of the post indicated. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 381 mm intervals. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond

or reducing the fabric height. Fabric shall be fastened to line posts at approximately 381 mm intervals and fastened to all rails and tension wires at approximately 610 mm intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 50 mm plus or minus 13 mm above the ground.

3.8 GATE INSTALLATION

Gates shall be installed at the locations shown. Hinged gates shall be mounted to swing as indicated. Latches, stops, and keepers shall be installed as required. Contractor shall provide a padlock for each of the chain link fence gate assemblies.

3.9 GROUNDING

Fences crossed by power lines of 600 volts or more shall be grounded at or near the point of crossing and at distances not exceeding 45 m on each side of crossing. Ground conductor shall consist of No. 8 AWG solid copper wire. Grounding electrodes shall be 19 mm by 3.05 m long copper-clad steel rod. Electrodes shall be driven into the earth so that the top of the electrode is at least 152 mm below the grade. Where driving is impracticable, electrodes shall be buried a minimum of 305 mm deep and radially from the fence. The top of the electrode shall be not less than 0.6 m or more than 2.4 m from the fence. Ground conductor shall be clamped to the fence and electrodes with bronze grounding clamps to create electrical continuity between fence posts, fence fabric, and ground rods. After installation the total resistance of fence to ground shall not be greater than 25 ohms.

3.10 POST AND CABLE RAILING SYSTEM INSTALLATION

3.10.1 Posts for Post and Cable Railing

Posts for Post and Cable Railing shall be installed as shown on the drawings. All posts for the post and cable railing installation shall be true vertical or plumb and not normal to the top of the channel walls. Grout shall be thoroughly consolidated around and under the base plate for each post of the post and cable railing system, and the consolidated grout shall be free of voids and finished to form the shape shown on the drawings. Grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts.

3.10.2 Cables for Post and Cable Railing

Cables for the post and cable railing shall be installed as shown in the drawings. Cables shall be pulled taut and shall be free of sag. Cables shall be parallel to the top of the channel wall.

3.10.3 After Installation

The Contractor shall examine and certify the operation of all post and cable railing not sooner than 30 days after installation.

3.11 TORTOISE FENCING INSTALLATION

Installation of the tortoise fence, temporary, shall be in accordance with the manufacturer recommendations. Shop drawings submittal (including steel tee post selection) of the tortoise fence is required and shall be approved by the Contracting Officer prior to installation. Steel tee posts for the tortoise fencing shall be driven plumb in the ground or as necessary shall be set plumb in holes formed in the ground and grouted into place. The grout shall be thoroughly consolidated around each steel tee post so as to be free of voids and finished to form a dome. The 1/2" galvanized mesh shall have the bottom portion buried 12" deep or bent over 12" with rocks/dirt placed on same. The Contractor shall maintain the tortoise fence throughout the life of the project. The tortoise fencing shall be removed in its entirety at the end of the contract, and the post holes backfilled to surrounding ground height. The Contractor may bury the bottom portion of the tortoise fence fabric into the ground as shown on the drawings or as an option may bend the fabric laying it on the ground and covering same with earth.

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SECTION 02921

SEEDING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AGRICULTURAL MARKETING SERVICE (AMS)

AMS (1940; R 1988; R 1998) Federal Seed Act

ASTM INTERNATIONAL (ASTM)

ASTM D 4972 (2001) pH of Soils

ASTM D 5268 (1992; R 1997) Topsoil Used for
Landscaping Purposes

1.2 PROFESSIONAL OVERSIGHT

The CONTRACTOR shall provide a licensed landscape professional with previous drill seeding and hydroseeding experience to oversee the seeding operations for the duration of this work type at the F-4 Basin/Channel, Blue Diamond Detention Basin and Flamingo Detention Basin project. To be considered qualified, the professional's experience must include at least 3 successful projects involving drill seeding and hydroseeding. See the landscape Contractor's qualification form in Section 02910 NATIVE PLANT EXTRACTION, SALVAGE AND STORAGE. The Contractor shall use the landscape subcontractor they were successful low bidder with and who meets the required qualifications. No landscape subcontractor substitutions shall be allowed.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Equipment.

Soil Stabilizer.

Chemical Treatment Material.

Manufacturer's literature including physical characteristics, application and installation instructions for equipment, soil stabilizer material and chemical treatment material.

Seeding Equipment.

A listing of seeding equipment to be used for the seeding operation.

Temporary Irrigation Plan; G, RE.

Temporary irrigation plan showing irrigation layout with list and descriptions of equipment, operation and proposed watering schedule.

SD-07 Certificates

Availability of topsoil from the stripping and stock piling operations.

Finished Grade and Topsoil Status.

Availability of topsoil from the stripping and stock piling operations and the finished grade status.

Seed.

Fertilizer.

Pesticide.

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

- a. Seed. Classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.
- b. Fertilizer. Chemical analysis and composition percent.
- c. Pesticide. EPA registration number and registered uses.
- d. Soil Stabilizer. Manufacturer, contents, recommended application rate, application method.

SD-06 Test Reports

Soil Sample Fertility Analyses Report; G, RE.

Seeding Equipment Calibration; G, RE.

Certification of calibration tests conducted on the equipment used in the

seeding operation.

SD-11 Closeout Submittals

Bi-Monthly Plant Maintenance Record; G, RE.

Record of maintenance activities including, watering, reseeding, weeding, fertilizing, and application of soil amendments and the specific areas where maintenance activities were conducted. The Contractor shall submit the information on the required Bi-Monthly Maintenance Record form included in the specifications.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.2 Storage

Materials shall be stored in designated areas. Seed, and fertilizer shall be stored in cool, dry locations away from contaminants.

1.4.3 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.4 Time Limitation

Hydroseeding time limitation for holding seed in the slurry shall be a maximum 8 hours.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS and applicable state seed laws.

2.1.2 Permanent Seed Species and Mixtures

Permanent seed species and mixtures shall be proportioned by weight as follows:

Scientific Name	Common Name	Kilograms per Hectare	% of Mixture By Weight
Hilaria rigida	Galleta grass	6.6	13.2
Oryzopsis hymenoides	Indian ricegrass	6.6	13.2
Sphaeralcea ambigua	Desert globemallow	3.7	7.4
Encelia virginensis	Virgin Mountains encelia	3.7	7.4
Baileya multiradiata	Desert Marigold	3.7	7.4
Eriogonum inflatum	Desert trumpet	3.7	7.4
Ambrosia dumosa	White bursage	7.2	14.4
Larrea tridentata	Creosote bush	4.5	9
Ephedra nevadensis	Nevada ephedra	5.5	11
Atriplex canescens	Four-wing saltbush	4.8	9.6
Total Application Rate		50	100
		(kilograms/hectare)	

(50 kilograms per hectare is equivalent to 44.5 pounds per acre)

2.1.3 Quality

Weed seed shall be a maximum one percent by weight of the total mixture.

2.1.4 Seed Mixing

The mixing of seed may be done by the seed supplier prior to delivery, or on site as verified by the Contracting Officer.

2.1.5 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

2.2 TOPSOIL

The topsoil shall be the existing 203 mm (8-inches) surface soil stripped and stockpiled onsite in accordance with Section 02300, EARTHWORK paragraph STRIPPING, BLM LAND ONLY. Unless otherwise notified by the Government, the topsoil shall conform to ASTM D 5268. The Contractor shall submit the availability of topsoil from the stripping and stock piling operations and the finished grade and topsoil status. Topsoil shall be free from large lumps of soil, large root wads, trash, spent ammunition, broken glass, or other material over a minimum 75 mm (3-inches) diameter. Topsoil may contain native viable plants or plant parts.

2.2.1 SOIL TEST

2.2.1.1 Soil Samples

The Contractor shall collect a minimum of six composite soil samples from locations on the site where revegetation activities will take place. Each of the six composite samples shall contain 725 grams (1.6 pounds) of soil for fertility testing.

2.2.1.2 Soil Sample Analysis

The Contractor shall have the soil samples analyzed and results reported for texture, pH, percent organic material, nitrates, phosphorus, potassium, calcium, sodium, soluble salts, aluminum, magnesium, manganese, zinc, iron, copper, sulfate, lead, and boron. The pH of the soil shall be determined in accordance with ASTM D 4972. The Contractor shall submit the Soil Sample Fertility Analyses Report.

2.3 SOIL AMENDMENTS

Soil amendments shall meet the following requirements.

2.3.1 Fertilizer

Fertilizer composition shall be formulated as recommended by the required soil fertility test. Fertilizer shall be controlled release commercial grade, free flowing, uniform in composition, and consist of a nitrogen-phosphorus-potassium ratio. The fertilizer shall be derived from sulphur coated urea, urea formaldehyde, plastic or polymer coated pills, or isobutylenediurea (IBDU). Fertilizer shall be balanced with the inclusion of trace minerals and micro-nutrients as recommended by the soil test. Fertilizer shall be applied at a rate of 160 kilograms per hectare (350 pounds per acre) or as recommended by the required soil fertility test.

2.3.1.1 Nitrogen Carrier Fertilizer

It shall be as recommended by the soil test. Nitrogen carrier fertilizer shall be commercial grade, free flowing, and uniform in composition. The fertilizer may be a liquid nitrogen solution.

2.3.1.2 Super Absorbent Polymers

To improve water retention in soils, super absorbent polymers shall be sized and applied according to the manufacturer's recommendations. Polymers shall be added as a soil amendment and be cross-linked polyacrylamide, with an absorption capacity of 250-400 times its weight. Polymers shall also be added to the seed and be a starch grafted polyacrylonitrile, with graphite added as a tacky sticker. It shall have an absorption capacity of 100 plus times its weight.

2.4 PIGMENTED DUST PALLIATIVE/SOIL STABILIZER PRODUCT

Soil stabilizer shall be a mixture of plaster and natural cellulose fiber mulch. The plaster cellulose fiber mulch stabilizer shall be Plas-Tex(tm) Soil Stabilizer as formulated by Soil-Tech Co., 5375 Cameron Dr., Las Vegas, NV 89118 (702) 873-2023) or approved equal. Proposed substitutions must be submitted to the Contracting Officer for review and approval.

2.4.1 Soil Stabilizer Properties

The plaster shall consist of naturally occurring high purity gypsum and necessary additives, such as retarders and accelerators and water to formulate a binder that will produce a protective crust-like barrier within 4 to 8 hours after application.

The gypsum shall be produced from a quarried or mined source. In addition, the processed gypsum shall be composed of a crushed dry calcium sulfate hemihydrate (CA S04 1/2H2O) having a purity of not less than 88 percent. The processed gypsum plus necessary additives shall be furnished either in bags or bulk and be accompanied by certificates stating the gypsum's purity content, dry weight and source of manufacture. Processed gypsum, which has become partially air set, lumpy or caked, shall not be used.

The cellulose fiber mulch shall be produced from grinding clean, whole wood chips. The wood chips shall be thermally dehydrated to produce a high quality blend of fibers, dyed with a non-toxic vegetable based dye to aid in visual metering during application. The moisture content shall average 12 percent.

A color pigment shall be added to the slurry at the time of application. The pigment color shall be selected to blend with the existing site colors. Sample test plots of the proposed pigment color(s) shall be tested at the project site and approved by the Contracting Officer prior to application on the specified areas.

2.4.2 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

2.5 IRRIGATION WATER

Irrigation water shall be the responsibility of the Contractor. Irrigation water shall not contain elements toxic to plant life.

2.6 CHEMICAL TREATMENT MATERIAL

If necessary, the Contractor shall submit any additional chemical treatment material information.

PART 3 EXECUTION

3.1 INSTALLING SEED TIME AND CONDITIONS

3.1.1 Seeding Time

Seed shall be installed from March 1 to April 30 for spring establishment; and from September 1 to October 30 for fall establishment. If the Contractor elects to seed outside of the specified seeding periods, the Contractor shall notify the Contracting Officer in writing of the reason

for the variance and describe the dates the seeding is actually performed.

3.1.2 Seeding Conditions

Seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed by the Contracting Officer. When special conditions warrant a variance to the seeding operations, the Contractor shall submit proposed alternate times to the Contracting Officer for approval.

3.1.3 Seeding Equipment Calibration

Immediately prior to the commencement of seeding operations, calibration tests shall be conducted on the seeding equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be provided within 1 week of testing. Information on other equipment planned for utilization in the operation shall be submitted.

3.1.4 Seeding Equipment Sanitized

Immediately prior to the commencement of seeding operations, the seeding equipment shall be sanitized and cleaned of any pest organisms, insect and/or animal eggs, spores, weed seeds or propagules remaining from previous job sites.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil Status

The Contractor shall verify that finished grades are as indicated on drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 02300, EARTHWORK, prior to the commencement of the seeding operation.

3.2.2 Application of Soil Amendments

3.2.2.1 Applying Fertilizer

Fertilizer shall be applied at a rate of 160 kilograms per hectare (350 pounds per acre) or as recommended by the required soil fertility test. The application rate recommended by the fertility test shall be the actual application rate if different from the 160 kilogram application rate. Fertilizer shall be incorporated into the soil to a maximum 205 mm (8-inches) depth or may be incorporated as part of the tillage or hydroseeding operation.

3.2.2.2 Applying Super Absorbent Polymers

Polymers shall be spread uniformly over the soil as recommended by the manufacturer and thoroughly incorporated by tillage into the soil to a

maximum 100 mm (4 inch) depth.

3.2.3 Tillage

Soil on slopes up to a maximum 3-horizontal-to-1-vertical shall be tilled to a minimum 152 mm (6 inch) depth. Rototillers shall be used where soil conditions and length of slope permit. Areas compacted by construction operations shall be completely pulverized by tillage. Fertilizer may be applied during this procedure.

3.2.4 Prepared Surface

3.2.4.1 Preparation

The prepared surface shall be a maximum 50 mm (2 inch) below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris.

3.2.4.2 Protection

Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 INSTALLATION

Prior to installing seed, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

3.3.1 Installing Seed

Seeding method shall be Broadcast Seeding, Drill Seeding or Hydroseeding. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved. Absorbent polymer powder shall be mixed with the dry seed at the rate recommended by the manufacturer.

3.3.1.1 Broadcast Seeding

Seed shall be uniformly broadcast at the rate of 50 kilograms per hectare (44.5 pounds per acre) using broadcast seeders. Half the total rate of seed application shall be broadcast in 1 direction, with the remainder of the seed rate broadcast at 90 degrees from the first direction. Seed shall be covered a maximum 6 mm depth by disk harrow, steel mat drag, cultipacker, or other approved device. Broadcast seeding shall be used in all areas not reachable by hydroseeding, or areas behind boulders.

3.3.1.2 Drill Seeding

Seed shall be uniformly drilled to a maximum 13 mm depth and at the rate of 50 kilograms per hectare (44.5 pounds per acre), using equipment having

drills a maximum 175 mm distance apart. Row markers shall be used with the drill seeder. Half the total rate of seed application shall be drilled in 1 direction, with the remainder of the seed rate drilled at 90 degrees from the first direction. The drilling equipment shall be maintained with half full seed boxes during the seeding operations. Drill seeding shall be used on all areas flatter than 8H:1V.

3.3.1.3 Rolling

The entire area shall be firmed with a roller not exceeding 130 kilograms per meter roller width. Slopes over a maximum 3-horizontal-to-1 vertical shall not be rolled. Areas seeded with seed drills equipped with rollers shall not be rolled.

3.3.2 Hydroseeding

Seed shall be mixed to ensure broadcast at the rate of 50 kilograms per hectare (44.5 pounds per acre). Seed and fertilizer shall be added to water and thoroughly mixed to meet the rates specified. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Wood cellulose fiber mulch and tackifier shall be added at the rates recommended by the manufacturer after the seed, fertilizer, and water are thoroughly mixed to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled. Hydroseeding shall be used on slopes steeper than 8H:1V.

3.3.3 Application of Pigmented Dust Palliative/Soil Stabilizer

The plaster/cellulose fiber mulch stabilizer shall be applied at a rate of 2,240 kilograms of plaster per hectare and 1,685 kilograms of wood fiber mulch per hectare. The specified seed mixture shall be added to the stabilizer mulch slurry. The slurry shall be such that when applied, the material shall form a protective coating that reduces water and wind induced erosion. Application shall not be permitted during high winds or when other weather conditions are unsuitable.

A minimum of three 3.0 meter x 3.0 meter on-site test plots shall be sprayed to determine the pigment color for the slurry. The Contracting Officer shall approve the pigment color prior to the Contractor beginning application on the project areas.

3.3.4 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

3.3.5 Irrigation System Approval

The Contractor shall review all short-term and long-term irrigation system proposals with the contracting officer representative to ensure that said systems are adequate. No irrigation systems shall be installed or implemented without review and approval by the contracting officer representative. Approvals from the contracting officer representative

shall be obtained 2 weeks prior to the time to begin required irrigation.

3.3.5.1 Temporary Irrigation Plan

The Contractor shall submit the temporary irrigation plan.

3.3.6 Watering Requirements

Watering shall be started immediately after completing the seeding of an area. Water shall be applied twice every week during the hottest summer months (or as required to germinate the seed) and twice per month during the remainder of the first year or as directed by the Contracting Officer. Run-off and puddling shall be prevented. Watering trucks shall not be driven over seeded areas, unless otherwise directed. Watering of other adjacent areas or plant material shall be prevented.

3.3.7 Soil and Plant Damage Caused by Irrigation

Any damage to soils or plants that result from the Contractor's excessive or irregular irrigation practices shall be repaired within 1 week by the Contractor at no additional cost.

3.4 QUANTITY CHECK

For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

3.5 APPLICATION OF PESTICIDE

When application of a pesticide becomes necessary to remove a pest or disease, a pesticide treatment plan shall be submitted and coordinated with the pest management program.

3.5.1 Technical Representative

The certified installation pest management coordinator shall be the technical representative, and shall be present at all meetings concerning treatment measures for pest or disease control. They may be present during treatment application.

3.5.2 Application

A state certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. Clothing and personal protective equipment shall be used as specified on the pesticide label. A closed system is recommended as it prevents the pesticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be fitted with a backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Prior to each day of use,

the equipment used for applying pesticide shall be inspected for leaks, clogging, wear, or damage. Any repairs are to be performed immediately. A pesticide plan shall be submitted.

3.6 RESTORATION AND CLEAN UP

3.6.1 Restoration

Seeded areas, plant materials, and facilities that have been damaged from the seeding operation shall be restored to original condition at Contractor's expense.

3.6.2 Clean Up

Excess and waste material shall be removed from the seeded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

3.7 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed.

3.8 SEED ESTABLISHMENT PERIOD

3.8.1 Commencement

The seed establishment period to obtain a healthy stand of plants shall begin after the last day of the seeding operation and shall end 12 months later or at the end of the plant establishment period defined in Section 02930 EXTERIOR PLANTING, whichever is longer. Written calendar time period shall be furnished for the seed establishment period. The seed establishment period shall be coordinated with Section 02930 EXTERIOR PLANTING. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

3.8.2 Satisfactory Stand of Plants

Shrubs shall be evaluated for species and health when the plants are 15 to 30 cm high. Herbaceous plants shall be evaluated for health at a height of 80 mm

3.8.2.1 Seeded Areas

A satisfactory stand of plants from the seeding operation for seeded areas shall be a minimum of 55 percent cover. The total bare area shall not exceed 45 percent of the total seeded area. If specified coverage is not met at the end of the establishment period the Contractor shall reseed bare areas when conditions are favorable for seeding success. Reseeding times must be approved by the Contracting Officer.

3.8.3 Maintenance During Establishment Period

Maintenance of the seeded areas shall include eradicating weeds, insects

and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; watering; and post-fertilization.

3.8.3.1 Post-Fertilization

The fertilizer shall be applied as recommended by the soil test. A maximum 4 kilograms per hectare of actual available nitrogen shall be provided to the plants. The application shall be timed prior to the advent of winter dormancy and shall be made without burning the hydroseeded area.

3.8.3.2 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph APPLICATION OF PESTICIDE.

3.8.3.3 Repair or Reinstall

Unsatisfactory stand of plants and mulch shall be repaired or reinstalled, and eroded areas shall be repaired in accordance with paragraph SITE PREPARATION.

3.8.3.4 Bi-Monthly Plant Maintenance Record

A Bi-Monthly Plant Maintenance Record of each site shall be furnished, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of plants. The attached form at the end of Section 02930 shall be used to record maintenance activities and shall be submitted to the Contracting Officer every 2 weeks.

3.9 FINAL ACCEPTANCE

3.9.1 Preliminary Inspection

Prior to the completion of the establish period, a preliminary inspection shall be held by the Contracting Officer. Time for the inspection shall be established in writing. The acceptability of the seeded areas in accordance with the specification shall be determined. An unacceptable stand of hydroseeded area shall be replanted per paragraph BROADCAST SEEDING and as directed by the Contracting Officer as soon as seeding conditions permit.

3.9.2 Final Inspection

A final inspection shall be held by the Contracting Officer to determine that the deficiencies noted in the preliminary inspection have been corrected. Time for the final inspection shall be in writing.

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SECTION 03301

CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI 117	(1990) Standard Tolerances for Concrete Construction and Materials & Commentary
ACI 211.1	(1991) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 214R	(2002) Evaluation of Strength Test Results of Concrete
ACI 305R	(1999) Hot Weather Concreting
ACI 318M/318RM	(2002) Metric Building Code Requirements for Structural Concrete and Commentary

ASTM INTERNATIONAL (ASTM)

ASTM C 31/C 31M	(2000e1) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(2002a) Concrete Aggregates
ASTM C 39/C 39M	(2001) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 40	(1999) Organic Impurities in Fine Aggregates for Concrete
ASTM C 42/C 42M	(1999) Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C 87	(1983; R 1995e1) Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
ASTM C 94/C 94M	(2000e2) Ready-Mixed Concrete
ASTM C 127	(2001) Density, Relative Density (Specific

	Gravity), and Absorption of Coarse Aggregate
ASTM C 128	(2001) Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C 131	(2001) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(2001) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 142	(1997) Clay Lumps and Friable Particles in Aggregates
ASTM C 143/C 143M	(2000) Slump of Hydraulic Cement Concrete
ASTM C 150	(2002a) Portland Cement
ASTM C 172	(1999) Sampling Freshly Mixed Concrete
ASTM C 192/C 192M	(2002) Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 231	(1997e1) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(2001) Air-Entraining Admixtures for Concrete
ASTM C 295	(1998) Petrographic Examination of Aggregates for Concrete
ASTM C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494/C 494M	(1999ae1) Chemical Admixtures for Concrete
ASTM C 535	(2001) Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 566	(1997) Total Evaporable Moisture Content of Aggregate by Drying
ASTM C 597	(1997) Pulse Velocity Through Concrete
ASTM C 618	(2001) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C 803/C 803M	(1997e1) Penetration Resistance of Hardened Concrete

ASTM C 805	(2002) Rebound Number of Hardened Concrete
ASTM C 881/C 881M	(2002) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C 1059	(1999) Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C 1064/C 1064M	(2001) Temperature of Freshly Mixed Portland Cement Concrete
ASTM C 1077	(2002) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C 1107	(2002) Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C 1260	(2001) Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM D 75	(1997) Sampling Aggregates

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 94	(1995) Surface Retarders
COE CRD-C 100	(1975) Method of Sampling Concrete Aggregate and Aggregate Sources, and Selection of Material for Testing
COE CRD-C 104	(1980) Method of Calculation of the Fineness Modulus of Aggregate
COE CRD-C 130	(1989) Scratch Hardness of Coarse Aggregate Particles
COE CRD-C 143	(1962) Specifications for Meters for Automatic Indication of Moisture in Fine Aggregate
COE CRD-C 318	(1979) Cloth, Burlap, Jute (or Kenaf)
COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete
COE CRD-C 521	(1981) Standard Test Method for Frequency and Amplitude of Vibrators for Concrete
ER 1110-1-2002	(30 Sep 1998) Cement, Slag, and Pozzolan Acceptance Testing

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44 (2002) NIST Handbook 44: Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB 100 (1996) Concrete Plant Standards

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Concrete Mixture Proportioning.

Concrete mixture proportions shall be determined by the Contractor and submitted for review. The concrete mixture quantities of all ingredients per cubic meter and nominal maximum coarse aggregate size that will be used in the manufacture of each quality of concrete shall be stated. Proportions shall indicate the mass of cement, pozzolan when used, and water; the mass of aggregates in a saturated surface-dry condition; and the quantities of admixtures. The submission shall be accompanied by test reports from a laboratory complying with ASTM C 1077 which show that proportions thus selected will produce concrete of the qualities indicated.

No substitution shall be made in the source or type of materials used in the work without additional tests to show that the quality of the new materials and concrete are satisfactory.

Batch Plant.

Capacity.

The Contractor shall submit batch plant data to the Contracting Officer for review for conformance with applicable specifications.

Concrete Mixers.

Conveying Equipment.

Placing Equipment.

All concrete mixers, conveying equipment, and placing equipment and methods shall be submitted for review by the Contracting Officer for conformance with paragraph CAPACITY.

Tests and Inspections.

Testing Technicians.

Concrete Transportation Construction Inspector (CTCI).

The Contractor shall submit statements that the concrete testing technicians and the concrete inspectors meet the specified requirements. The individuals who perform the inspection of concrete construction shall have demonstrated a knowledge and ability equivalent to the ACI minimum guidelines for certification of Concrete Transportation Construction Inspector (CTCI).

Construction Joint Treatment; G, RE.

The method and equipment proposed for joint cleanup and waste disposal shall be submitted for review and approval.

Curing and Protection; G, RE.

The curing medium and methods to be used shall be submitted for review and approval.

Cold-Weather Placing; G, RE.

If concrete is to be placed under cold-weather conditions, the proposed materials, methods, and protection shall be submitted for approval.

Hot-Weather Placing; G, RE.

If concrete is to be placed under hot-weather conditions, the proposed materials and methods shall be submitted for review and approval.

Finishing; G, RE.

The proposed materials and methods to be used for finishing concrete shall be submitted for review and approval.

SD-04 Samples

Aggregates.

Cementitious Materials, Admixtures, and Curing Compound.

Samples of materials for government testing and approval shall be submitted as required in paragraph PRECONSTRUCTION SAMPLING AND TESTING.

SD-06 Test Reports

Quality of Aggregates.

Aggregate quality tests shall be submitted at least 30 days prior to start of concrete placement.

Mixer Uniformity.

The results of the initial mixer uniformity tests shall be submitted at least 5 days prior to the initiation of placing.

Test Results and Inspection Reports.

Test results and inspection reports shall be submitted daily and weekly as required in paragraph REPORTS.

SD-07 Certificates

Cementitious Materials.

Cementitious Materials, including Cement and Pozzolan, will be accepted on the basis of the manufacturer's certification of compliance, accompanied by mill test reports that materials meet the requirements of the specification under which they are furnished. Certification and mill test reports shall be from samples taken from the particular lot furnished. No cementitious materials shall be used until notice of acceptance has been given by the Contracting Officer. Cementitious materials will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. Material not meeting specifications shall be promptly removed from the site of work.

Chemical Admixtures.

Chemical Admixtures (air-entraining, accelerating, water reducing or retarding admixtures) shall be certified for compliance with all specification requirements.

Membrane-Forming Curing Compound.

Membrane-Forming Curing Compound shall be certified for compliance with all specification requirements.

Epoxy Resin.

Latex Bonding Compound.

Epoxy Resin and Latex Bonding Compound shall be certified for compliance with all specification requirements.

Nonshrink Grout.

Descriptive literature of the Nonshrink Grout proposed for use shall be furnished together with a certificate from the manufacturer stating that it is suitable for the application or exposure for which it is being considered.

1.3 GOVERNMENT TESTING AND SAMPLING

The Government will sample and test aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75. Concrete will be sampled in accordance with ASTM C 172.

1.3.1 Preconstruction Sampling and Testing

1.3.1.1 Aggregates

The aggregate sources listed in Section 2.1.2 for aggregates have been tested and at the time testing was performed were capable of producing materials of a quality required for this project provided suitable processing is performed. The Contractor may furnish materials from a listed source or from a source not listed. Samples from any source of coarse aggregate and any source of fine aggregate selected by the Contractor, consisting of not less than 70 kg of each size coarse aggregate and 35 kg of fine aggregate taken under the supervision of the Contracting Officer in accordance with COE CRD-C 100 shall be delivered to a local materials testing laboratory within 15 days after notice to proceed. Sampling and shipment of samples shall be at the Contractor's expense. Sixty days will be required to complete evaluation of the aggregates. Testing will be performed by and at the expense of the Government in accordance with the applicable COE CRD-C or ASTM test methods. The cost of testing one source for each size of aggregate will be borne by the Government. If the Contractor selects more than one source for each aggregate size or selects a substitute source for any size aggregate after the original source was tested, the cost of that additional testing will be borne by the Contractor. Tests to which aggregate may be subjected are listed in paragraph QUALITY OF AGGREGATES. The material from the proposed source shall meet the quality requirements of this paragraph. The Government's test data and other information on aggregate quality of those sources listed herein after are included in the Design Memorandum and are available for review in the district office. Testing of aggregates by the Government does not relieve the Contractor of the requirements outlined in paragraph TESTS AND INSPECTIONS.

1.3.1.2 Cementitious Materials, Admixtures, and Curing Compound

At least 60 days in advance of concrete placement, the Contractor shall notify the Contracting Officer of the sources for cementitious materials, admixtures, and curing compound, along with sampling location, brand name, type, and quantity to be used in the manufacture and/or curing of the concrete.

1.3.2 Construction Testing by the Government

1.3.2.1 General

The Government will sample and test cementitious materials, admixtures, aggregates, and concrete during construction as considered appropriate to determine compliance with the specifications. The Contractor shall provide

facilities and labor as may be necessary for procurement of representative test sample. Samples of aggregates will be obtained at the point of batching in accordance with COE CRD-C 100. Slump and air content will be determined in accordance with ASTM C 143/C 143M and ASTM C 231, respectively, except the point of sampling will be as delivered to the point of placement. Compression test specimens will be made and laboratory cured in accordance with ASTM C 31/C 31M and will be tested in accordance with ASTM C 39/C 39M.

1.3.2.2 Testing Aggregates

Testing performed by the Government will not relieve the Contractor of his responsibility for testing as appropriate for quality control. During construction, aggregates will be sampled for acceptance testing as delivered to the mixer to determine compliance with specification provisions. The Contractor shall provide necessary facilities and labor for the ready procurement of representative samples under Contracting Officer supervision. The Government will test such samples at its expense using appropriate COE CRD-C and ASTM test methods.

1.3.2.3 Cementitious Materials

Cementitious materials shall be sampled at the mill, shipping point, or site of the work by the Contracting Officer. If tests prove that a material which has been delivered is unsatisfactory, it shall be promptly removed from the site of the work. Cementitious materials that have not been used within 6 months after being tested will be retested by the Government at the expense of the Contractor when directed.

1.3.2.4 Cement

Cement shall be tested for conformance with ASTM C 150 and the requirements specified herein. The cement will also be evaluated under the guidelines used to establish a qualified cement source as outlined in ER 1110-1-2002; Appendix A, Cement Quality Management System. The cement producer will be required to submit samples for physical and chemical testing, as well as historic quality control data. Cement will be sampled and tested by or under the supervision of the Contracting Officer and at the Government's expense. No cement shall be used until notice has been given by the Contracting Officer that test results for chemical and physical requirements as well as all evaluation requirements are satisfactory. In the event of failure, the cement may be resampled and tested at the request of the Contractor and at the Contractor's expense. Cement will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. A copy of the mill tests from the cement manufacturer shall be furnished to the Contracting Officer for each lot delivered to the site of the work. The cost of testing cement excess to project requirements or of retesting as a result of failure of tests or change of sources will also be at the Contractor's expense and will be deducted from payments due the Contractor at a rate of \$3,200.00 per test. Material not meeting specifications shall be promptly removed from the site of work.

1.3.2.5 Pozzolan

The pozzolan shall be tested for conformance with ASTM C 618 and the requirements specified herein. The pozzolan will also be evaluated under the guidelines used to establish a qualified pozzolan source as outlined in ER 1110-1-2002; Appendix B, Pozzolan Quality Management System. The pozzolan producer will be required to submit samples for physical and chemical testing, as well as historic quality control data. Pozzolan will be sampled and tested by or under the supervision of the Contracting Officer and at the Government's expense. No pozzolan shall be used until notice has been given by the Contracting Officer that test results for chemical and physical requirements as well as all evaluation requirements are satisfactory. In the event of failure, the pozzolan may be resampled and tested at the request of the Contractor and at the Contractor's expense. Pozzolan will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. A copy of the mill tests from the pozzolan manufacturer shall be furnished to the Contracting Officer for each lot delivered to the site of the work. The cost of testing pozzolan excess to project requirements or of retesting as a result of failure of tests or change of sources will also be at the Contractor's expense and will be deducted from payments due the Contractor at a rate of \$3,200.00 per test. Material not meeting specifications shall be promptly removed from the site of work.

1.3.2.6 Chemical Admixtures

The Contractor shall provide satisfactory facilities for ready procurement of adequate test samples. All sampling and testing of a chemical admixture will be by and at the expense of the Government. Tests will be conducted using samples of materials proposed for the project. Chemical admixtures that have been in storage at the project site for longer than 6 months or that have been subjected to freezing shall be retested at the expense of the Contractor when directed by the Contracting Officer and shall be rejected if test results are not satisfactory. Chemical admixtures will be accepted based on compliance with the requirements of paragraph CHEMICAL ADMIXTURES in PART 2 of this Section.

1.3.3 Concrete Strength

Compressive strength test specimens will be made by the Government and cured in accordance with ASTM C 31/C 31M and tested in accordance with ASTM C 39/C 39M. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'_c and no individual test result falls below the specified strength f'_c by more than 3.5 MPa. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including nondestructive testing, taking cores and/or load tests may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.

- a. Investigation of Low-Strength Test Results - When any strength test

of standard-cured test cylinders falls below the specified strength requirement by more than 3.5 MPa or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C 597, ASTM C 803/C 803M, or ASTM C 805 may be permitted by the Contracting Officer to estimate the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests shall not be used as a basis for acceptance or rejection.

b. Testing of Cores - When the strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42/C 42M. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the performance of the structure. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement.

c. Load Tests - If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318M/318RM. Concrete work evaluated by structural analysis or by results of a load test shall be corrected in a manner satisfactory to the Contracting Officer. All investigations, testing, load tests, and correction of deficiencies will be performed and approved by the Contracting Officer at the expense of the Contractor, except that if all concrete is in compliance with the plans and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

1.4 DESIGN REQUIREMENTS

1.4.1 Concrete Strength

Compressive strength f'_c shall be 30 MPa at 28 days for box conduit concrete structure and confluence structures. Compressive strength f'_c shall be 25 MPa at 28 days for open and/or u-channel and other concrete structures.

1.4.2 Maximum Water-Cement (W/C) Ratio

Maximum W/C shall be 0.45 for all concrete structures.

1.5 CONSTRUCTION TOLERANCES

1.5.1 General

The definitions of the terms used in the following tables shall be as defined in ACI 117. Level and grade tolerance measurements of slabs shall

be made as soon as possible after finishing. When forms or shoring are used, the measurements shall be made prior to removal. Tolerances are not cumulative. The most restrictive tolerance controls. Tolerances shall not extend the structure beyond legal boundaries. Except as specified otherwise, plus tolerance increases the amount or dimension to which it applies, or raises a level alignment, and minus tolerance decreases the amount or dimension to which it applied, or lowers a level alignment. A tolerance without sign means plus or minus. Where only one signed tolerance is specified, there is no limit in the other direction.

TOLERANCE FOR FINISHED FORMED CONCRETE SURFACES

(1) Vertical alignment

Formed surfaces slope with respect to the specified plane

Vertical alignment of outside corner of exposed corner columns and control joint grooves in concrete exposed to view 7 mm in 1000 mm

All other conditions 10 mm in 3000 mm

(2) Abrupt variation

The offset between concrete surfaces for the following classes of surface:

Class A	3 mm
Class B	6 mm
Class C	6 mm
Class D	25 mm

(3) Gradual variation

Surface finish tolerances as measured by placing a freestanding (unleveled), 1.5 m straightedge for plane surface or curved template for curved surface anywhere on the surface and allowing it to rest upon two high spots within 72 hr after concrete placement. The gap at any point between the straightedge or template and the surface shall not exceed:

Class A	3 mm
Class B	6 mm
Class C	13 mm
Class D	25 mm

TOLERANCES FOR CHANNEL LINING AND FOR STRUCTURES EXPOSED TO FLOW

(1) Lateral alignment

TOLERANCES FOR CHANNEL LINING AND FOR STRUCTURES EXPOSED TO FLOW

Alignment of tangents	50	mm
Alignment of curves	100	mm
Width of section at any height	$0.0025W + 25$	mm

(2) Level alignment

Profile grade	25 mm
Surface of invert	6 mm
Height of lining	$0.005H + 25$ mm

(3) Cross-sectional dimensions

Thickness of lining cross section: 10 percent specified thickness provided average thickness is maintained as determined by daily batch volumes.

TOLERANCES FOR CONDUITS AND CULVERTS

(1) Lateral alignment

Centerline alignment

Water conveying conduits,
and culverts 13 mm

Inside dimensions 0.005 times inside dimension

(2) Level alignment

Profile grade

Water conveying conduits,
and culverts 13 mm

Surface of invert 6 mm

Surface of side slope 13 mm

(3) Cross-sectional dimension

Thickness at any point

Conduits and Culverts.....	+5 percent thickness but not less than 13 mm
.....	-2.5 percent thickness but not less than 6 mm

1.5.2 Appearance

Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by a method that does not harm the concrete and that is

approved by the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Cementitious materials shall be portland cement, or portland-pozzolan cement, and shall conform to appropriate specifications listed below.

2.1.1.1 Portland Cement

ASTM C 150, Type II low alkali.

2.1.1.2 High-Early-Strength Portland Cement

ASTM C 150, Type III, with C_3A limited to 8 percent low alkali, used only when specifically approved in writing.

2.1.1.3 Pozzolan

Pozzolan shall conform to ASTM C 618, Class F, with the loss of ignition limited to 6 percent.

2.1.2 Aggregates

2.1.2.1 General

Concrete aggregates may be furnished from any source capable of meeting the quality requirements of ASTM C 33. No guarantee is given or implied that any of the listed sources are currently capable of producing aggregates that meet the requirements of ASTM C 33. Fine and coarse aggregates shall conform to the grading requirements of ASTM C 33. The nominal maximum size shall be as listed in paragraph NOMINAL MAXIMUM-SIZE COARSE AGGREGATE. Where the use of highway department gradations are permitted, proposed gradations shall be submitted for approval.

2.1.2.2 Concrete Aggregate Sources

- a. List of Sources - The concrete aggregates sources may be selected from the following list:

Nevada Ready Mix	Lone Mountain Pit
CSR Materials	Buffalo Road Pit
Hanson Aggregates	Henderson

- b. Selection of Source - After the award of the contract, the Contractor shall designate in writing only one source or combination of sources from which he proposes to furnish aggregates. If the Contractor proposes to furnish aggregates from a source or from sources not listed at the end of this section, he may designate only a single source or single combination of sources for aggregates. Regardless of the source, selected samples for acceptance testing shall be provided

as required by paragraph GOVERNMENT TESTING AND SAMPLING. If a source for coarse or fine aggregates so designated by the Contractor does not meet the quality requirements stated in paragraph QUALITY OF AGGREGATES, the Contractor may not submit for approval other non-listed sources but shall furnish the coarse or fine aggregate, as the case may be, from sources listed above at no additional cost to the Government.

2.1.3 CHEMICAL ADMIXTURES

Chemical admixtures to be used, when required or permitted, shall conform to the appropriate specification listed.

2.1.3.1 Air-Entraining Admixture

The air-entraining admixture shall conform to ASTM C 260 and shall consistently cause the concrete to have an air content in the specified ranges under field conditions.

2.1.3.2 Accelerating Admixture

Accelerators shall meet the requirements of ASTM C 494/C 494M, Type C or E, except that calcium chloride or admixtures containing calcium chloride shall not be used.

2.1.3.3 Water-Reducing or Retarding Admixture

a. Water-Reducing or Retarding Admixtures: ASTM C 494/C 494M, Type A, B, or D, except that the 6-month and 1-year compressive strength tests are waived.

b. High-Range Water Reducing Admixture: ASTM C 494/C 494M, Type F or G except that the 6-month and 1-year strength requirements shall be waived. The admixture may be used only when approved by the Contracting Officer, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan.

2.1.4 Curing Materials

2.1.4.1 Membrane-Forming Curing Compound

The membrane-forming curing compound shall conform to ASTM C 309, Type 2, except a styrene acrylate or chlorinated rubber compound meeting Class B requirements shall be used for surfaces that are to be painted or are to receive bituminous roofing, or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, coating, or flooring specified. Nonpigmented compound shall contain a fugitive dye and shall have the reflective requirements in ASTM C 309 waived.

2.1.4.2 Burlap

Burlap used for curing shall conform to COE CRD-C 318.

2.1.5 Water

Water for mixing and curing shall be fresh, clean, potable, and free of injurious amounts of oil, acid, salt, or alkali, except that nonpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.6 Nonshrink Grout

Nonshrink grout shall conform to ASTM C 1107 and shall be a commercial formulation suitable for the application proposed.

2.1.7 Latex Bonding Compound

Latex bonding compound agents for bonding fresh to hardened concrete shall conform to ASTM C 1059.

2.1.8 Epoxy Resin

Epoxy resin for use in repairs shall conform to ASTM C 881/C 881M, Type III, Grade I or II.

2.2 CONCRETE MIXTURE PROPORTIONING

2.2.1 Quality of Mixture

For each portion of the structure, mixture proportions shall be selected so that the strength and W/C requirements listed in paragraph DESIGN REQUIREMENTS are met.

2.2.2 Nominal Maximum-Size Coarse Aggregate

Nominal maximum-size coarse aggregate shall be 37.5 mm except 19.0 mm nominal maximum-size coarse aggregate shall be used when any of the following conditions exist: the narrowest dimension between sides of forms is less than 190 mm, the depth of the slab is less than 100 mm, or the minimum clear spacing between reinforcing is less than 55 mm.

2.2.3 Air Content

Air content as delivered to the forms and as determined by ASTM C 231 shall be between 4 and 7 percent except that when the nominal maximum-size coarse aggregate is 19.0 mm, it shall be between 4-1/2 and 7-1/2 percent.

2.2.4 Slump

The slump shall be determined in accordance with ASTM C 143/C 143M and shall be within the range of 25 mm to 100 mm. Where placement by pump is approved, the slump shall not exceed 150 mm.

2.2.5 Concrete Proportioning

Trial batches and testing requirements for various qualities of concrete specified shall be the responsibility of the Contractor. Samples of aggregates shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregate shall be representative of

those proposed for the project and shall be accompanied by the manufacturer's test reports indicating compliance with applicable specified requirements. Trial mixtures having proportions, consistencies, and air content suitable for the work shall be made based on methodology described in ACI 211.1, using at least three different water-cement ratios, which will produce a range of strength encompassing those required for the work. The maximum water-cement ratios required in paragraph MAXIMUM WATER-CEMENT RATIO will be converted to a weight ratio of water to cement plus pozzolan by mass, as described in ACI 211.1. If pozzolan is used in the concrete mixture, the minimum pozzolan content shall be 15 percent of the total cementitious material. Trial mixtures shall be proportioned for maximum permitted slump and air content with due consideration to the approved conveying and placement method. The temperature of concrete in each trial batch shall be reported. For each water-cement ratio, at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192/C 192M. They shall be tested at 7 days and at the design age specified in paragraph DESIGN REQUIREMENTS in accordance with ASTM C 39/C 39M. From these test results, a curve will be plotted showing the relationship between water-cement ratio and strength.

2.2.6 Required Average Compressive Strength

In meeting the strength requirements specified in paragraph CONCRETE STRENGTH, the selected mixture proportion shall produce a required average compressive strength f'_{cr} exceeding the specified strength f'_c by the amount indicated below.

2.2.6.1 Average Compressive Strength from Test Records

Where a concrete production facility has test records, a standard deviation shall be established in accordance with the applicable provisions of ACI 214R. Test records from which a standard deviation is calculated shall represent materials, quality control procedures, and conditions similar to those expected, shall represent concrete produced to meet a specified strength or strengths (f'_c) within 6.89 MPa of that specified for proposed work, and shall consist of at least 30 consecutive tests. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at another test age designated for determination of f'_c .

Required average compressive strength f'_{cr} used as the basis for selection of concrete proportions shall be the larger of the equations that follow using the standard deviation as determined above:

$$\begin{aligned}f'_{cr} &= f'_c + 1.34S \\f'_{cr} &= f'_c + 2.33S - 3.45 \text{ MPa}\end{aligned}$$

Where S = standard deviation

Where a concrete production facility does not have test records meeting the requirements above but does have a record based on 15 to 29 consecutive tests, a standard deviation shall be established as the product of the calculated standard deviation and a modification factor from the following table:

NUMBER OF TESTS* less than 15	MODIFICATION FACTOR FOR STANDARD DEVIATION Use tabulation in paragraph DETERMINING REQUIRED AVERAGE STRENGTH
15	1.16
20	1.08
25	1.03
30 or more	1.00

*Interpolate for intermediate numbers of tests.

2.2.6.2 Average Compressive Strength without Previous Test Records

When a concrete production facility does not have sufficient field strength test records for calculation of the standard deviation, the required average strength f'_{cr} shall be determined as follows:

If the specified compressive strength f'_c is less than 20.7 MPa,

$$f'_{cr} = f'_c + 6.89 \text{ MPa}$$

If the specified compressive strength f'_c is 20.7 to 34.5 MPa,

$$f'_{cr} = f'_c + 8.27 \text{ MPa}$$

If the specified compressive strength f'_c is over 34.5 MPa,

$$f'_{cr} = f'_c + 9.65 \text{ MPa}$$

PART 3 EXECUTION

3.1 EQUIPMENT

3.1.1 Capacity

The batching, mixing, conveying, and placing equipment shall have a capacity of at least 100 cubic meters per hour.

3.1.2 Batch Plant

Batch plant shall conform to the requirements of NRMCA CPMB 100 and as specified; however, rating plates attached to batch plant equipment are not required.

3.1.2.1 Batching Equipment

The batching controls shall be, semiautomatic. The semiautomatic batching system shall be provided with interlocks such that the discharge device cannot be actuated until the indicated material is within the applicable tolerance. The batching system shall be equipped with an accurate recorder or recorders that meet the requirements of NRMCA CPMB 100. Separate bins or compartments shall be provided for each size group of aggregate and cement, and pozzolan. Aggregates shall be weighed either in separate weigh

batchers with individual scales or cumulatively in one weigh batcher on one scale. Aggregate shall not be weighed in the same batcher with cement or pozzolan. If both cement and pozzolan are used, they may be batched cumulatively provided that the portland cement is batched first. If measured by mass, the mass of the water shall not be weighed cumulatively with another ingredient. Water batcher filling and discharging valves shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed. An accurate mechanical device for measuring and dispensing each admixture shall be provided. Each dispenser shall be interlocked with the batching and discharging operation of the water so that each admixture is separately batched and discharged automatically in a manner to obtain uniform distribution throughout the batch in the specified mixing period. Admixtures shall not be combined prior to introduction in water. The plant shall be arranged so as to facilitate the inspection of all operations at all times. Suitable facilities shall be provided for obtaining representative samples of aggregates from each bin or compartment. All filling ports for cementitious materials bins or silos shall be clearly marked with a permanent sign stating the contents.

3.1.2.2 Scales

The equipment for batching by mass shall conform to the applicable requirements of NIST HB 44, except that the accuracy shall be plus or minus 0.2 percent of scale capacity. The Contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring devices. Tests shall be made at the frequency required in paragraph TESTS AND INSPECTIONS, and in the presence of a government inspector.

3.1.2.3 Batching Tolerances

a. Weighing Tolerances

MATERIAL	PERCENT OF REQUIRED MASS
Cementitious materials	0 to plus 2
Aggregate	plus or minus 2
Water	plus or minus 1
Chemical admixture	0 to plus 6

b. Volumetric Tolerances - For volumetric batching equipment, the following tolerances shall apply to the required volume of material being batched:

Water: Plus or minus 1 percent.
Chemical admixtures: Zero to plus 6 percent.

3.1.2.4 Moisture Control

The plant shall be capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the masses of the materials being batched. An electric moisture meter complying with the provisions of COE CRD-C 143 shall be provided for measuring moisture in the

fine aggregate. The sensing element shall be arranged so that the measurement is made near the batcher charging gate of the sand bin or in the sand batcher.

3.1.3 Concrete Mixers

The concrete mixers shall not be charged in excess of the capacity recommended by the manufacturer. The mixers shall be operated at the drum or mixing blade speed designated by the manufacturer. The mixers shall be maintained in satisfactory operating condition, and the mixer drums shall be kept free of hardened concrete. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired.

3.1.3.1 Stationary Mixers

Concrete plant mixers shall be tilting, nontilting, horizontal-shaft, vertical-shaft, or pugmill and shall be provided with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed.

The mixing time and uniformity shall conform to all the requirements in ASTM C 94/C 94M applicable to central-mixed concrete.

3.1.3.2 Truck Mixers

Truck mixers, the mixing of concrete therein, and concrete uniformity shall conform to the requirements of ASTM C 94/C 94M. A truck mixer may be used either for complete mixing (transit-mixed) or to finish the partial mixing done in a stationary mixer (shrink-mixed). Each truck shall be equipped with two counters from which it will be possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed.

3.1.4 Conveying Equipment

The conveying equipment shall conform to the following requirements.

3.1.4.1 Buckets

The interior hopper slope shall be not less than 58 degrees from the horizontal, the minimum dimension of the clear gate opening shall be at least five times the nominal maximum-size aggregate, and the area of the gate opening shall not be less than 0.2 square meter. The maximum dimension of the gate opening shall not be greater than twice the minimum dimension. The bucket gates shall be essentially grout tight when closed and may be manually, pneumatically, or hydraulically operated except that buckets larger than 1.5 cubic meters shall not be manually operated. The design of the bucket shall provide means for positive regulation of the amount and rate of deposit of concrete in each dumping position.

3.1.4.2 Transfer Hoppers

Concrete may be charged into nonagitating hoppers for transfer to other conveying devices. Transfer hoppers shall be capable of receiving concrete directly from delivery vehicles and have conical-shaped discharge features.

The transfer hopper shall be equipped with a hydraulically operated gate and with a means of external vibration to effect complete discharge. Concrete shall not be held in nonagitating transfer hoppers more than 30 minutes.

3.1.4.3 Trucks

Truck mixers operating at agitating speed or truck agitators used for transporting plant-mixed concrete shall conform to the requirements of ASTM C 94/C 94M. Nonagitating equipment may be used for transporting plant-mixed concrete over a smooth road when the hauling time is less than 15 minutes. Bodies of nonagitating equipment shall be smooth, watertight, metal containers specifically designed to transport concrete, shaped with rounded corners to minimize segregation, and equipped with gates that will permit positive control of the discharge of the concrete.

3.1.4.4 Chutes

When concrete can be placed directly from a truck mixer, agitator, or nonagitating equipment, the chutes attached to this equipment by the manufacturer may be used. A discharge deflector shall be used when required by the Contracting Officer. Separate chutes and other similar equipment will not be permitted for conveying concrete.

3.1.4.5 Belt Conveyors

Belt conveyors shall be designed and operated to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients or loss of mortar and shall be provided with positive means for preventing segregation of the concrete at the transfer points and the point of placing. Belt conveyors shall be constructed such that the idler spacing shall not exceed 900 mm. The belt speed shall be a minimum of 90 m per minute and a maximum of 230 m per minute. If concrete is to be placed through installed horizontal or sloping reinforcing bars, the conveyor shall discharge concrete into a pipe or elephant trunk that is long enough to extend through the reinforcing bars.

3.1.4.6 Concrete Pumps

Concrete may be conveyed by positive displacement pump when approved. The pumping equipment shall be piston or squeeze pressure. The pipeline shall be rigid steel pipe or heavy-duty flexible hose. The inside diameter of the pipe shall be at least three times the nominal maximum-size coarse aggregate in the concrete mixture to be pumped but not less than 100 mm. Aluminum pipe shall not be used.

3.1.5 Vibrators

Vibrators of the proper size, frequency, and amplitude shall be used for the type of work being performed in conformance with the following requirements:

APPLICATION	HEAD DIAMETER mm	FREQUENCY VPM	AMPLITUDE mm
Thin walls, beams, etc.	32 to 64	9,000 to 13,500	0.5 to 1.0
General construction	50 to 88	8,000 to 12,000	0.6 to 1.2

The frequency and amplitude shall be determined in accordance with COE CRD-C 521.

3.2 PREPARATION FOR PLACING

3.2.1 Embedded Items

Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Embedded items shall be free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids. Welding, including tack welding, will not be permitted on embedded metals within 600 mm of the surface of the concrete.

3.2.2 Concrete on Earth Foundations

Earth surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the earth foundation shall have been satisfactorily compacted in accordance with Section 02300 EARTHWORK.

3.2.3 Concrete on Rock Foundations

Rock surfaces upon which concrete is to be placed shall be clean, free from oil, standing or running water, ice, mud, drummy rock, coating, debris, and loose, semidetached, or unsound fragments. Joints in rock shall be cleaned to a satisfactory depth, as determined by the Contracting Officer, and to firm rock on the sides. Immediately before the concrete is placed, all rock surfaces shall be cleaned thoroughly by the use of air-water jets or sandblasting as described in paragraph CONSTRUCTION JOINT TREATMENT. All rock surfaces shall be kept continuously wet for at least 24 hours immediately prior to placing concrete thereon. All approximately horizontal surfaces shall be covered, immediately before the concrete is placed, with a layer of mortar proportioned similar to that in the concrete mixture. The mortar shall be covered with concrete before the time of initial setting of the mortar.

3.2.4 Construction Joint Treatment

Construction joint treatment shall conform to the following requirements.

3.2.4.1 Joint Preparation

Concrete surfaces to which additional concrete is to be bonded shall be

prepared for receiving the next lift or adjacent concrete by cleaning with either air-water cutting, sandblasting, high-pressure water jet, or other approved method. Air-water cutting will not be permitted on formed surfaces or surfaces congested with reinforcing steel. Regardless of the method used, the resulting surfaces shall be free from all laitance and inferior concrete so that clean, well bonded coarse aggregate is exposed uniformly throughout the lift surface. The edges of the coarse aggregate shall not be undercut. The surface shall be washed clean again as the last operation prior to placing the next lift. There shall be no standing water on the surface upon which concrete is placed.

3.2.4.2 Air-Water Cutting

Air-water cutting of a construction joint shall be performed at the proper time and only on horizontal construction joints. The air pressure used in the jet shall be 620 to 760 kPa, and the water pressure shall be just sufficient to bring the water into effective influence of the air pressure.

When approved by the Contracting Officer, a retarder complying with the requirements of COE CRD-C 94 may be applied to the surface of the lift to prolong the period of time during which air-water cutting is effective. Prior to receiving approval, the Contractor shall furnish samples of the material to be used and shall demonstrate the method to be used in applications. After cutting, the surface shall be washed and rinsed as long as there is any trace of cloudiness of the wash water. Where necessary to remove accumulated laitance, coatings, stains, debris, and other foreign material, high-pressure water jet or sandblasting will be required as the last operation before placing the next lift.

3.2.4.3 High-Pressure Water Jet

A stream of water under a pressure of not less than 20.7 MPa may be used for cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse-aggregate particles. If the water jet is incapable of a satisfactory cleaning, the surface shall be cleaned by sandblasting.

3.2.4.4 Wet Sandblasting

This method may be used when the concrete has reached sufficient strength to prevent undercutting of the coarse aggregate particles. The surface of the concrete shall then be washed thoroughly to remove all loose materials.

3.2.4.5 Waste Disposal

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall be subject to approval.

3.3 PLACING

3.3.1 Placing Procedures

The surfaces of horizontal construction joints shall be kept continuously wet for the first 12 hours during the 24-hour period prior to placing concrete. Surfaces may be dampened immediately before placement if necessary. Concrete placement will not be permitted when, in the opinion of the Contracting Officer, weather conditions prevent proper placement and consolidation. Concrete shall be deposited as close as possible to its final position in the forms and, in so depositing, there shall be no vertical drop greater than 1.5 m except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it may be effectively consolidated in horizontal layers 600 mm or less in thickness with a minimum of lateral movement. The amount deposited in each location shall be that which can be readily and thoroughly consolidated. Sufficient placing capacity shall be provided so that concrete placement can be kept plastic and free of cold joints while concrete is being placed. Concrete shall be placed by methods that will prevent segregation or loss of ingredients. Any concrete transferred from one conveying device to another shall be passed through a hopper that is conical in shape. The concrete shall not be dropped vertically more than 1.5 m, except where a properly designed and sized elephant truck with rigid drop chute bottom section is provided to prevent segregation and where specifically authorized. In no case will concrete be discharged to free-fall through reinforcing bars. All concrete shall be placed from the low elevation end to the higher elevation end (up slope) unless otherwise approved by the Contracting Officer.

3.3.2 Placement by Pump

When concrete is to be placed by pump, the nominal maximum-size coarse aggregate shall not be reduced to accommodate the pumps. The distance to be pumped shall not exceed limits recommended by the pump manufacturer. The concrete shall be supplied to the concrete pump continuously. When pumping is completed, concrete remaining in the pipeline shall be ejected without contamination of concrete in place. After each operation, equipment shall be thoroughly cleaned, and flushing water shall be wasted outside of the forms. Grout used to lubricate the pumping equipment at the beginning of the placement will not be incorporated into the placement.

3.3.3 Time Interval Between Mixing and Placing

Concrete shall be placed within 30 minutes after discharge into nonagitating equipment. When concrete is truck-mixed or when a truck mixer or agitator is used for transporting concrete mixed by a concrete plant mixer, the concrete shall be delivered to the site of the work, and discharge shall be completed within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates or the introduction of the cement to the aggregates. When the length of haul makes it impossible to deliver truck-mixed concrete within these time limits, batching of cement and a portion of the mixing water shall be delayed until the truck mixer is at or near the construction site.

3.3.4 Cold-Weather Placing

When cold-weather placing of concrete is likely to be subjected to freezing temperatures before the expiration of the curing period, it shall be placed in accordance with procedures previously submitted in accordance with paragraph SUBMITTALS. The ambient temperature of the space adjacent to the concrete placement and surfaces to receive concrete shall be above 0 degrees C. The placing temperature of the concrete having a minimum dimension less than 300 mm shall be between 12 and 24 degrees C when measured in accordance with ASTM C 1064/C 1064M. The placing temperature of the concrete having a minimum dimension greater than 300 mm shall be between 10 and 20 degrees C. Heating of the mixing water or aggregates will be required to regulate the concrete-placing temperatures. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals, or other materials shall not be mixed with the concrete to prevent freezing.

3.3.5 Hot-Weather Placing

Concrete shall be properly placed and finished with procedures previously submitted in accordance with paragraph SUBMITTALS. The concrete-placing temperature shall not exceed 30 degrees C when measured in accordance with ASTM C 1064/C 1064M. Cooling of the mixing water and aggregates, or both, may be required to obtain an adequate placing temperature. A retarder meeting the requirements of paragraph WATER-REDUCING OR RETARDING ADMIXTURE may be used to facilitate placing and finishing. Steel forms and reinforcement shall be cooled prior to concrete placement when steel temperatures are greater than 50 degrees C. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete-placing temperature.

3.3.6 Consolidation

Immediately after placement, each layer of concrete, including flowing concrete, shall be consolidated by internal vibrating equipment. Vibrators shall not be used to transport concrete within the forms. Hand spading may be required, if necessary, with internal vibrating along formed surfaces permanently exposed to view. Form or surface vibrators shall not be used unless specifically approved. The vibrator shall be inserted vertically at uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator. The vibrator shall penetrate rapidly to the bottom of the layer and at least 150 mm into the preceding unhardened layer if such exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly.

3.4 FINISHING

The ambient temperature of spaces adjacent to surfaces being finished shall be not less than 5 degrees C. In hot weather when the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305R, may reasonably be expected to exceed 1.0 kilogram per square meter per hour. Provisions for windbreaks, shading, fog spraying, or wet covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow. All unformed surfaces that are not to be covered by additional

concrete or backfill shall have a float finish. Additional finishing shall be as specified below and shall be true to the elevation shown in the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevation shown on the drawings and left true and regular. Exterior surfaces shall be sloped for drainage unless otherwise shown in the drawing or as directed. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. Grate tampers or jitterbugs shall not be used.

3.4.1 Unformed Surfaces

3.4.1.1 Float Finish

Surfaces shall be screeded and darbied or bullfloated to bring the surface to the required finish level with no coarse aggregate visible. No water, cement, or mortar shall be added to the surface during the finishing operation. The concrete, while still green but sufficiently hardened to bear a man's weight without deep imprint, shall be floated to a true and even plane. Floating may be performed by use of suitable hand floats or power-driven equipment. Hand floats shall be made of magnesium or aluminum.

3.4.1.2 Trowel Finish

A trowel finish shall be applied to the top of channel walls. Concrete surfaces shall be finished with a float finish, and after surface moisture has disappeared, the surface shall be troweled to a smooth, even, dense finish free from blemishes including trowel marks.

3.4.1.3 Broom Finish

A broom finish shall be applied to the face and surfaces of concrete channel inverts, and sidewalls. The concrete surface shall be screeded and floated finish plane with no coarse aggregate visible. After surface moisture disappears, the surface shall be broomed or brushed screeded and fine hair-broom or fiber bristle brushed in a direction transverse to that of the channel centerline for all invert side slope areas, or as directed.

3.4.2 Formed Surfaces

Unless another finish is specified, surfaces shall be left with the texture imparted by the forms except that defective surfaces shall be repaired as described in paragraph FORMED SURFACE REPAIR.

Uniform color of the concrete shall be maintained by use of only one mixture without changes in materials or proportions for any structure or portion of structure that is exposed to view or on which a special finish is required. The form panels used to produce the finish shall be orderly in arrangement. Forms shall not be reused if there is any evidence of surface wear or defects that would impair the quality of the surface.

3.4.3 Formed Surface Repair

After removal of forms, all ridges, lips, and bulges on surfaces permanently exposed shall be removed. All repairs shall be completed

within 48 hours after form removal.

3.4.3.1 Class A Finishes

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have class A finishes shall have surface defects repaired as follows: defective areas, voids, and honeycombs smaller than 10,000 square millimeters in area and less than 13 mm deep and bug holes exceeding 13 mm in diameter shall be chipped and filled with dry-packed mortar. Holes left by removal of tie rods shall be reamed and filled with dry-packed mortar as specified in paragraph MATERIAL AND PROCEDURE FOR REPAIRS. Defective and unsound concrete areas larger than described shall be defined by 13 mm deep dovetailed saw cuts in a rectangular pattern with lines parallel to the formwork, the defective concrete removed by chipping, and the void repaired with replacement concrete. The prepared area shall be brush-coated with an epoxy resin meeting the requirements of paragraph EPOXY RESIN, a latex bonding agent meeting the requirements of paragraph LATEX BONDING COMPOUND, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph MATERIAL AND PROCEDURE FOR REPAIRS.

3.4.3.2 Class D Finish

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have class D finish shall have surface defects repaired as follows: defective areas, voids, and honeycombs greater than 30,000 square millimeters in area or more than 50 mm deep shall be defined by 13 mm deep dovetailed saw cuts in a rectangular pattern, the defective concrete removed by chipping and the void repaired with replacement concrete. The prepared area shall be brush-coated with an epoxy resin meeting the requirements of paragraph EPOXY RESIN, a latex bonding agent meeting the requirements of paragraph LATEX BONDING COMPOUND, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph MATERIAL AND PROCEDURE FOR REPAIRS.

3.4.3.3 Material and Procedure for Repairs

The cement used in the dry-packed mortar or replacement concrete shall be a blend of the cement used for production of project concrete and white portland cement properly proportioned so that the final color of the mortar or concrete will match adjacent concrete. Trial batches shall be used to determine the proportions required to match colors. Dry-packed mortar shall consist of one part cement to two and one-half parts fine aggregate. The fine aggregate shall be that used for production of project concrete. The mortar shall be remixed over a period of at least 30 minutes without addition of water until it obtains the stiffest consistency that will permit placing. Mortar shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc. and struck off to match adjacent concrete. Replacement concrete shall be produced using project materials and shall be proportioned by the Contracting Officer. It shall be thoroughly compacted into the prepared void by internal vibration, tamping, rodding, ramming, etc. and shall be struck off and finished to match adjacent concrete. Forms shall be used to confine the concrete. If an expanding agent is used in the repair concrete, the repair shall be

thoroughly confined on all sides including the top surface. Metal tools shall not be used to finish permanently exposed surfaces. The repaired areas shall be cured for 7 days. The temperature of the in situ concrete, adjacent air, and replacement mortar or concrete shall be above 5 degrees C during placement, finishing, and curing. Other methods and materials for repair may be used only when approved in writing by the Contracting Officer. Repairs of the so called "plaster-type" will not be permitted.

3.5 CURING AND PROTECTION

3.5.1 Duration

Concrete shall be cured by an approved method for a period of 7 days.

Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, and mechanical damage. All materials and equipment needed for adequate curing and protection shall be available and at the placement site prior to the start of concrete placement. Concrete shall be protected from the damaging effects of rain for 12 hours and from flowing water for 14 days. No fire or excessive heat including welding shall be permitted near or in direct contact with concrete or concrete embedments at any time.

3.5.2 Moist Curing

Moist-cured concrete shall be maintained continuously, not periodically, wet for the entire curing period. If water or curing materials stain or discolor concrete surfaces that are to be permanently exposed, they shall be cleaned as required in paragraph APPEARANCE. Where wooden form sheathing is left in place during curing, the sheathing shall be kept wet at all times. Where steel forms are left in place during curing, the forms shall be carefully broken loose from the hardened concrete and curing water continuously applied into the void so as to continuously saturate the entire concrete surface. Horizontal surfaces may be moist cured by ponding, by covering with a minimum uniform thickness of 50 mm of continuously saturated sand, or by covering with saturated nonstaining burlap or cotton mats. Horizontal construction joints may be allowed to dry for 12 hours immediately prior to the placing of the following lift.

3.5.3 Membrane-Forming Curing Compound

Concrete may be cured with an approved membrane-forming curing compound in lieu of moist curing except that membrane curing will not be permitted on any surface containing protruding steel reinforcement.

3.5.3.1 Application

The curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. The surfaces shall be thoroughly moistened with water, and the curing compound applied as soon as free water disappears. The curing compound shall be applied to unformed surfaces as soon as free water has disappeared and bleeding has stopped. The curing compound shall be applied in a

two-coat continuous operation by approved motorized power-spraying equipment operating at a minimum pressure of 500 kPa, at a uniform coverage of not more than 10 square meters per liter for each coat, and the second coat shall be applied perpendicular to the first coat. Concrete surfaces that have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. All concrete surfaces on which the curing compound has been applied shall be adequately protected for the duration of the entire curing period from pedestrian and vehicular traffic and from any other cause that will disrupt the continuity of the curing membrane.

3.5.4 Evaporation Retardant

Sheet curing shall not be used on vertical or near-vertical surfaces. All surfaces shall be thoroughly wetted and be completely covered with waterproof paper or polyethylene-coated burlap having the burlap thoroughly water-saturated before placing. Covering shall be laid with light-colored side up. Covering shall be lapped not less than 300 mm and securely weighted down or shall be lapped not less than 100 mm and taped to form a continuous cover with completely closed joints. The sheet shall be weighted to prevent displacement so that it remains in contact with the concrete during the specified length of curing. Coverings shall be folded down over exposed edges of slabs and secured by approved means. Sheets shall be immediately repaired or replaced if tears or holes appear during the curing period.

3.5.5 Cold-Weather Curing and Protection

When the daily outdoor low temperature is less than 0 degrees C, the temperature of the concrete shall be maintained above 5 degrees C for the first 7 days after placing. In addition, during the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that concrete near the surface will not be subjected to a temperature differential of more than 15 degrees C as determined by observation of ambient and concrete temperatures indicated by suitable temperatures measuring devices furnished by the Government as required and installed adjacent to the concrete surface and 50 mm inside the surface of the concrete. The installation of the thermometers shall be made by the Contractor at such locations as may be directed.

3.6 SETTING OF POSTS, BASE PLATES, AND BEARING PLATES

3.6.1 Setting of Posts and Plates

After being plumbed and properly positioned, posts, column base plates, bearing plates for beams and similar structural members, and machinery and equipment base plates shall be provided with full bearing with nonshrink grout. The space between the top of concrete or masonry-bearing surface and the bottom of the plate shall be approximately 1/24 of the width of the plate, but not less than 13 mm for plates less than 300 mm wide. Concrete surfaces shall be rough, clean, and free of oil, grease, and laitance, and they shall be damp. Metal surfaces shall be clean and free of oil, grease, and rust.

3.6.2 Nonshrink Grout Application

Nonshrink grout shall conform to the requirements of paragraph NONSHRINK GROUT. Water content shall be the minimum that will provide a flowable mixture and fill the space to be grouted without segregation, bleeding, or reduction of strength.

3.6.2.1 Mixing and Placing of Nonshrink Grout

Mixing and placing shall be in conformance with the material manufacturer's instructions and as specified. Ingredients shall be thoroughly dry-mixed before adding water. After adding water, the batch shall be mixed for 3 minutes. Batches shall be of size to allow continuous placement of freshly mixed grout. Grout not used within 30 minutes after mixing shall be discarded. The space between the top of the concrete or masonry-bearing surface and the plate shall be filled solid with the grout. Forms shall be of wood or other equally suitable material for retaining the grout and shall be removed after the grout has set. If grade "A" grout as specified in ASTM C 1107 is used, all surfaces shall be formed to provide restraint. The placed grout shall be worked to eliminate voids; however, overworking and breakdown of the initial set shall be avoided. Grout shall not be retempered or subjected to vibration from any source. Where clearances are unusually small, placement shall be under pressure with a grout pump. Temperature of the grout, and of surfaces receiving the grout, shall be maintained at 20 to 30 degrees C until after setting.

3.6.2.2 Treatment of Exposed Surfaces

After the grout has set, those types containing metallic aggregate shall have the exposed surfaces cut back 25 mm and immediately covered with a parge coat of mortar proportioned by mass of one part portland cement, two parts sand, and sufficient water to make the mixture placeable. The parge coat shall have a smooth, dense finish. The exposed surface of other types of nonshrink grout shall have a smooth, dense finish.

3.6.2.3 Curing

Grout and parge coats shall be cured in conformance with paragraph CURING AND PROTECTION.

3.7 TESTS AND INSPECTIONS

Tests and inspections shall conform to the following requirements. Test Results and Inspection Reports are to be submitted to the Government as required.

3.7.1 General

The Contractor shall perform the inspections and tests described below, and, based upon the results of these inspections and tests, he shall take the action required and submit reports as required. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease. The laboratory performing the tests shall be on site and shall conform with ASTM C 1077. The individuals who sample

and test concrete or the constituents of concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I. The individuals who perform the inspection of concrete construction shall have demonstrated a knowledge and ability equivalent to the ACI minimum guidelines for certification of Concrete Transportation Construction Inspector (CTCI). The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations and at least once per year thereafter for conformance with ASTM C 1077.

3.7.2 Testing and Inspection Requirements

3.7.2.1 Fine Aggregate

- a. Grading - At least once during each shift when the concrete plant is operating, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C 136 and COE CRD-C 104 for the fine aggregate or for each size range of fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits.
- b. Corrective Action for Fine Aggregate Grading - When the amount passing on any sieve is outside the specification limits, the fine aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer.
- c. Moisture Content Testing - When in the opinion of the Contracting Officer the electric moisture meter is not operating satisfactorily, there shall be at least four tests for moisture content in accordance with ASTM C 566 during each 8-hour period of mixing plant operation. The times for the tests shall be selected randomly within the 8-hour period. An additional test shall be made whenever the slump is shown to be out of control or excessive variation in workability is reported by the placing foreman. When the electric moisture meter is operating satisfactorily, at least two direct measurements of moisture content shall be made per week to check the calibration of the meter. The results of tests for moisture content shall be used to adjust the added water in the control of the batch plant.
- d. Moisture Content Corrective Action - Whenever the moisture content of the fine aggregate changes by 0.5 percent or more, the scale settings for the fine-aggregate batcher and water batcher shall be adjusted (directly or by means of a moisture compensation device) if necessary to maintain the specified slump.

3.7.2.2 Coarse Aggregate

- a. Grading - At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 for each size of coarse aggregate. The location at which

samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations shall show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for control which are coarser than the specification limits for samples taken at locations other than as delivered to the mixer to allow for degradation during handling.

b. Corrective Action for Grading - When the amount passing any sieve is outside the specification limits, the coarse aggregate shall be immediately resampled and retested. If the second sample fails on any sieve, that fact shall be reported to the Contracting Officer. Where two consecutive averages of five tests are outside specification limits, the operation shall be considered out of control and shall be reported to the Contracting Officer. Concreting shall be stopped and immediate steps shall be taken to correct the grading.

c. Coarse Aggregate Moisture Content - A test for moisture content of each size group of coarse aggregate shall be made at least twice per week. When two consecutive readings for smallest size coarse aggregate differ by more than 1.0 percent, frequency of testing shall be increased to that specified above for fine aggregate, until the difference falls below 1.0 percent.

d. Coarse Aggregate Moisture Corrective Action - Whenever the moisture content of any size of coarse aggregate changes by 0.5 percent or more, the scale setting for the coarse aggregate batcher and the water batcher shall be adjusted if necessary to maintain the specified slump.

3.7.2.3 Quality of Aggregates

a. Frequency of Quality Tests - Thirty days prior to the start of concrete placement the Contractor shall perform all tests for aggregate quality listed below. In addition, after the start of concrete placement, the Contractor shall perform tests for aggregate quality in accordance with the frequency schedule shown below. Samples tested after the start of concrete placement shall be taken immediately prior to entering the concrete mixer.

FREQUENCY

PROPERTY	FINE AGGREGATE	COARSE AGGREGATE	TEST
Specific Gravity	Every 3 months	Every 3 months	ASTM C 127 ASTM C 128
Absorption	Every 3 months	Every 3 months	ASTM C 127 ASTM C 128
Clay Lumps			

PROPERTY	FREQUENCY		TEST
	FINE AGGREGATE	COARSE AGGREGATE	
and Friable Particles	Every 3 months	Every 3 months	ASTM C 142
Impurities	Every 3 months	Not applicable	ASTM C 40 ASTM C 87
LA Abrasion	Not applicable	Every 6 months	ASTM C 131 ASTM C 535
Soft and Friable (Scratch) Hardness)on	Not applicable	Every 6 months	COE CRD-C 130
Alkali Reactivity of Aggregates	Every 6 months	Every 6 months	ASTM C 1260
Petrographic Examination	Every 12 months	Every 12 months	ASTM C 295

b. Corrective Action for Aggregate Quality - If the result of a quality test fails to meet the requirements for quality immediately prior to start of concrete placement, production procedures or materials shall be changed and additional tests shall be performed until the material meets the quality requirements prior to proceeding with either mixture proportioning studies or starting concrete placement. After concrete placement commences, whenever the result of a test for quality fails the requirements, the test shall be rerun immediately. If the second test fails the quality requirement, the fact shall be reported to the Contracting Officer and immediate steps taken to rectify the situation.

3.7.2.4 Scales

a. Weighing Accuracy - The accuracy of the scales shall be checked by test weights prior to start of concrete operations and at least once every 3 months for conformance with the applicable requirements of paragraph BATCHING EQUIPMENT. Such tests shall also be made as directed whenever there are variations in properties of the fresh concrete that could result from batching errors.

b. Batching and Recording Accuracy - Once a week the accuracy of each batching and recording device shall be checked during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. The Contractor shall confirm that the calibration devices described in paragraph BATCH PLANT for checking the accuracy of dispensed admixtures are operating properly.

c. Scales Corrective Action - When either the weighing accuracy or batching accuracy does not comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made. Discrepancies in recording accuracies shall be corrected immediately.

3.7.2.5 Batch-Plant Control

The measurement of all constituent materials including cementitious materials, each size of aggregate, water, and admixtures shall be continuously controlled. The aggregate weights and amount of added water shall be adjusted as necessary to compensate for free moisture in the aggregates. The amount of air-entraining agent shall be adjusted to control air content within specified limits. A report shall be prepared indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the required aggregate and water weights per cubic meter, amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic meter for each class of concrete batched during plant operation.

3.7.2.6 Concrete Mixture

a. Air Content Testing - At least two tests for air content shall be made on randomly selected batches of each separate concrete mixture produced during each 8-hour period of concrete production. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government quality assurance representative. Tests shall be made in accordance with ASTM C 231. For concrete having a nominal maximum aggregate size of 25 or 37 mm, the average of each set of two tests shall be plotted on a control chart on which the average is set at 5.5 percent and the upper and lower control limits at 7 and 4 percent respectively. For concrete having a nominal maximum aggregate size of 19 mm, the average shall be set at 6.0 percent and the upper and lower control limits at 7.0 and 5.0 percent, respectively. The control charts shall be submitted to the Contracting Officer.

b. Air Content Corrective Action - Whenever points on the control chart for percent air reach either warning limit, an adjustment shall immediately be made in the amount of air-entraining admixture batched. As soon as is practical after each adjustment, another test shall be made to verify the result of the adjustment. Whenever a point on the control chart range reaches the warning limit, the admixture dispenser shall be recalibrated to ensure that it is operating accurately and with good reproducibility. Whenever a point on either control chart reaches an action limit line, the air content shall be considered out of control and the concreting operation shall immediately be halted until the air content is under control. Additional air content tests shall be made when concreting is restarted. All this shall be at no extra cost to the Government.

c. Slump Testing - In addition to slump tests which shall be made when test specimens are fabricated, at least four slump tests shall be made

on randomly selected batches in accordance with ASTM C 143/C 143M for each separate concrete mixture produced during each 8-hour or less period of concrete production each day. Also, additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government's quality assurance representative. Test results shall be plotted on control charts which shall at all times be readily available to the Government. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single slump test reaches or goes beyond either the upper or lower action limit, a second test shall immediately be made on the same batch of concrete. The results of the two tests shall be averaged and this average used as the slump of the batch to plot on both the control chart for percent air and the chart for range, and for determining the need for any remedial action. An upper warning limit shall be set at 13 mm below the maximum allowable slump on separate control charts for percent air used for each type of mixture as specified in paragraph SLUMP, and an upper action limit line and lower action limit line shall be set at the maximum and minimum allowable slumps, respectively, as specified in the same paragraph. The range between each consecutive slump test for each type of mixture shall be plotted on a single control chart for range on which an upper action limit is set at 75 mm.

Samples for slump shall be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated slump. If the Contractor's materials or transportation methods cause slump loss between mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer and the slump at the mixer controlled as directed.

d. Slump Corrective Action - Whenever points on the control chart for slump reach the upper warning limit, an adjustment shall be immediately made in the batch weights of water and fine aggregate. The adjustments are to be made so that the total water content does not exceed that amount allowed by the maximum W/C specified, based upon aggregates which are in a saturated surface-dry condition. When a single slump reaches the upper or lower action limit, no further concrete shall be delivered to the placing site until proper adjustments have been made. Immediately after each adjustment, another test shall be made to verify the correctness of the adjustment. Whenever two consecutive slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range at or above the upper action limit, the concreting operation shall immediately be halted and the Contractor shall take appropriate steps to bring the slump under control. Also, additional slump tests shall be made as directed. All this shall be at no additional cost to the Government.

e. Temperature - The temperature of the concrete shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with ASTM C 1064/C 1064M. The temperature shall be reported along with the compressive strength data.

f. Compressive-Strength Specimens - **At least one set of test specimens shall be made each day on each different concrete mixture and/or type of structures placed during the day.** Additional sets of test cylinders

shall be made, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. A random sampling plan shall be developed by the Contractor and approved by the Contracting Officer prior to the start of construction. The plan shall assure that sampling is done in a completely random and unbiased manner. A set of test specimens for concrete with a 28-day specified strength per paragraph DESIGN REQUIREMENTS shall consist of four cylinders, two to be tested at 7 days and two at 28 days. A set of test specimens for concrete with a 90-day strength per specified paragraph DESIGN REQUIREMENTS shall consist of six cylinders, two tested at 7 days, two at 28 days, and two at 90 days. Test specimens shall be molded and cured in accordance with ASTM C 31/C 31M and tested in accordance with ASTM C 39/C 39M. All compressive-strength tests shall be reported immediately to the Contracting Officer. Quality control charts shall be kept for individual strength tests, moving average for strength, and moving average for range for each mixture. The charts shall be similar to those found in ACI 214R.

3.7.2.7 Inspection Before Placing

Foundation or construction joints, forms, and embedded items shall be inspected for quality by the Contractor in sufficient time prior to each concrete placement to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

3.7.2.8 Placing

a. Placing Inspection - The placing foreman shall supervise all placing operations, shall determine that the correct quality of concrete or grout is placed in each location as directed and shall be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, yardage placed, and method of placement. **Additionally, concrete test locations, batch ticket numbers and truck numbers when used, batch time, sample times, number of fabricated cylinders shall be recorded and submitted.**

b. Placing Corrective Action - The placing foreman shall not permit batching and placing to begin until he has verified that an adequate number of vibrators in working order and with competent operators are available. Placing shall not be continued if any pile of concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

3.7.2.9 Vibrators

a. Vibrator Testing and Use - The frequency and amplitude of each vibrator shall be determined in accordance with COE CRD-C 521 prior to initial use and at least once a month when concrete is being placed. Additional tests shall be made as directed when a vibrator does not appear to be adequately consolidating the concrete. The frequency shall be determined at the same time the vibrator is operating in

concrete with the tachometer held against the upper end of the vibrator head while almost submerged and just before the vibrator is withdrawn from the concrete. The amplitude shall be determined with the head vibrating in air. Two measurements shall be taken, one near the tip and another near the upper end of the vibrator head and these results averaged. The make, model, type, and size of the vibrator and frequency and amplitude results shall be reported in writing.

b. Vibrator Corrective Action - Any vibrator not meeting the requirements of paragraph VIBRATORS shall be immediately removed from service and repaired or replaced.

3.7.2.10 Curing

a. Moist-Curing Inspections - At least once each shift, and once per day on nonwork days an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

b. Moist-Curing Corrective Action - When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for such areas shall be extended by one (1) day.

c. Membrane-Curing Inspection - No curing compound shall be applied until the Contractor's authorized representative has verified that the compound is properly mixed and ready for spraying. At the end of each operation, he shall estimate the quantity of compound used by measurement of the container and the area of concrete surface covered and compute the rate of coverage in square meters per liter. He shall note whether or not coverage is uniform.

d. Membrane-Curing Corrective Action - When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.

e. Sheet-Curing Inspection - At least once each shift and once per day on nonwork days, an inspection shall be made of all areas being cured using material sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

f. Sheet-Curing Corrective Action - When a daily inspection report lists any tears, holes, or laps or joints that are not completely closed, the tears and holes shall promptly be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by one (1) day.

3.7.2.11 Cold-Weather Protection and Sealed Insulation Curing

At least once each shift and once per day on nonwork days, an inspection shall be made of all areas subject to cold-weather protection. The protection system shall be inspected for holes, tears, unsealed joints, or other deficiencies that could result in damage to the concrete. Special attention shall be taken at edges, corners, and thin sections. Any

deficiencies shall be noted, corrected, and reported.

3.7.2.12 Cold-Weather Protection Corrective Action

When a daily inspection report lists any holes, tears, unsealed joints, or other deficiencies, the deficiency shall be corrected immediately and the period of protection extended 1 day.

3.7.2.13 Mixer Uniformity

a. Stationary Mixers - Prior to the start of concrete placing and once every 6 months when concrete is being placed, or once for every 57,000 cubic meters of concrete placed, whichever results in the longest time interval, uniformity of concrete mixing shall be determined in accordance with ASTM C 94/C 94M.

b. Truck Mixers - Prior to the start of concrete placing and at least once every 6 months when concrete is being placed, uniformity of concrete shall be determined in accordance with ASTM C 94/C 94M. The truck mixers shall be selected randomly for testing. When satisfactory performance is found in one truck mixer, the performance of mixers of substantially the same design and condition of the blades may be regarded as satisfactory.

3.7.2.14 Mixer Uniformity Corrective Action

When a mixer fails to meet mixer uniformity requirements, either the mixer shall be removed from service on the work, the mixing time shall be increased, batching sequence changed, batch size reduced, or adjustments shall be made to the mixer until compliance is achieved.

3.7.3 Reports

All results of tests or inspections conducted shall be reported informally as they are completed and in writing daily. A weekly report shall be prepared for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all test and inspection records.

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SECTION 03361

SOIL CEMENT (SC)
FOR SLOPE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C 33	(2002a) Concrete Aggregates
ASTM C 70	(1994; R 2001) Surface Moisture in Fine Aggregate
ASTM C 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 136	(2001) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 150	(2002a) Portland Cement
ASTM C 174/C 174M	(1997) Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C 566	(1997) Total Evaporable Moisture Content of Aggregate by Drying
ASTM C 618	(2001) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C 1040	(1993; R 2000) Density of Unhardened and Hardened Concrete in Place by Nuclear Methods
ASTM C 1064/C 1064M	(2001) Temperature of Freshly Mixed Portland Cement Concrete
ASTM D 558	(1996) Moisture-Density Relations of Soil-Cement Mixtures

ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 1633	(2000) Compressive Strength of Molded Soil-Cement Cylinders
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM E 329	(2002) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 143	(1962) Specifications for Meters for Automatic Indication of Moisture in Fine Aggregate
COE CRD-C 318	(1979) Cloth, Burlap, Jute (or Kenaf)
COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44	(2002) NIST Handbook 44: Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices
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NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB 100	(1996) Concrete Plant Standards
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1.2 GOVERNMENT TESTING

1.2.1 Preconstruction Testing by the Government

At least 45 days in advance of the time when construction of the test section is expected to occur, the Contractor shall notify the Contracting Officer of the source, brand name, type, and quantity of all materials (other than aggregates) to be used in the manufacture of the soil cement. The Contractor shall assist the Contracting Officer in obtaining samples of each material. Testing as determined appropriate will be performed by and at the expense of the Government. Cement or fly ash is to be obtained from one source for each material.

1.2.2 Testing During Construction by the Government

1.2.2.1 General

The Government will sample and test cementitious materials, stockpiled aggregates, and soil cement during construction as considered appropriate to determine compliance with the specifications. The Contractor shall provide equipment and labor as may be necessary for procurement of representative test samples. Compression test specimens of soil cement will be made and tested by the Government. Density of the compacted soil cement will be checked by the Government as considered appropriate.

1.2.2.2 Aggregate Testing

Testing performed by the Government will not relieve the Contractor of his responsibility for testing under paragraph TESTS AND INSPECTIONS. During construction, aggregates will be sampled for acceptance testing for each specified aggregate stockpile, to determine compliance with specification provisions. The Contractor shall provide necessary equipment and labor for the ready procurement of representative samples under Government supervision. The Government will test such samples at its expense using the specified COE CRD-C and ASTM methods.

1.2.2.3 Cementitious Materials

Cement or pozzolan will be sampled at the mill, shipping point, or site of the work by the Government. Sampling and testing as determined appropriate will be performed by and at the expense of the Government. If tests prove that a material which has been delivered is unsatisfactory, it shall be promptly removed from the site of the work. Cementitious materials that have not been used within 6 months after being tested will be retested by the Government at the expense of the Contractor when directed by the Contracting Officer. Samples of representative materials shall be delivered to the laboratory listed below by the Contractor at his expense.

US Army Engineer Waterways Experiment Station
Concrete and Materials Branch, Building 6000
Geotechnical and Structures Laboratory
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

1.2.2.4 Cement Sources

Samples of cement for quality-assurance testing will be taken at the project site or cement-producing plant by the Contracting Officer, as determined appropriate, for testing at the expense of the Government. A copy of the mill tests from the cement manufacturer shall be furnished for each lot. Cement that has not been used within 6 months after testing will be retested at the expense of the Contractor, and will be rejected if test results are not satisfactory. No cement shall be used until notice has been given by the Contracting Officer that test results are satisfactory. In the event of failure, the cement may be resampled and tested at the request of the Contractor and at the Contractor's expense. The cost of testing cement excess to project requirements will also be at the Contractor's expense and will be deducted from payments due the Contractor at a rate of \$1750 per test.

1.2.2.5 Pozzolan Sources

Samples of pozzolan for check testing will be taken at the project site by the Contracting Officer (as needed) for testing at the expense of the Government. A copy of the test results from the pozzolan manufacturer shall be furnished for each lot. Pozzolan that has not been used within 6 months after testing will be retested at the expense of the Contractor, and will be rejected if test results are not satisfactory. No pozzolan shall be used until notice has been given by the Contracting Officer that test results are satisfactory. In the event of failure, the pozzolan may be resampled and tested at the Contractor's expense. The cost of testing excess pozzolan in excess of project requirements will be at the Contractor's expense at a rate of \$1650 per test. The amount will be deducted from payment to the Contractor.

1.3 CONSTRUCTION TOLERANCES

Construction tolerances shall be in accordance with paragraph TOLERANCE FOR SLOPE PROTECTION.

1.3.1 TOLERANCE FOR SLOPE PROTECTION

a. Surface Smoothness - After the completion of the final rolling of soil cement, the compacted surface shall be tested with a 3.05 m straightedge. Measurements will be made transverse and longitudinal to the soil cement surface at equal distances not to exceed 10 meters. The compacted surfaces from both transverse and longitudinal directions shall show no deviation in excess of 25 mm.

b. Thickness - The thickness of compacted lifts of soil cement shall be within zero to 25 mm of that specified. Deficiency in the thickness will be evaluated as described in paragraph THICKNESS EVALUATION.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Aggregate Source.

Proposed source(s) of aggregate to be used in the production of soil cement shall be submitted prior to stockpiling.

aggregate stockpile.

Prior to using the aggregate stockpile, it shall be analyzed by laboratory tests in order to determine the job mix as set forth in paragraph MIX DESIGN.

Mixture Proportioning; G, RE.

Laboratory test results to determine soil cement mix proportions, in conformance with paragraph MIX DESIGN, shall be submitted 10 days prior to construction of the test section.

Mixers.

Details and data on the soil cement mixing plant including manufacturer's literature on the cementitious material and aggregate feed equipment, water controls, pug mill mixers (plant type and capacity), and layout plan showing that the equipment meets all specified requirements, shall be submitted 30 days prior to plant assembly for review and approval by the Contracting Officer for conformance with the requirements of paragraph MIXERS.

Transporting Equipment.

Spreading Equipment.

Compaction Equipment.

A listing of the equipment, including manufacturer's literature, proposed for transporting, handling, depositing, spreading, and compacting the soil cement shall be submitted for review and approval by the Contracting Officer 45 days prior to construction of the test section.

Nuclear Density Gauge.

A description of the nuclear density gauge apparatus proposed for use including manufacturer's literature and the latest manufacturer's calibration results of the nuclear density gauge shall be submitted for review by the Contracting Officer 30 days prior to use.

Placement Plan, G, RE.

Details and placement methods of the soil cement including mixing plant layout, equipment, transporting, spreading, compacting, forming, grade control, curing and testing shall be submitted 45 days prior to construction of the test section.

SD-02 Shop Drawings

Batch Plant.

Details and data on the concrete plant shall be submitted 60 days prior to plant assembly for review by the Contracting Officer for conformance with the requirements of paragraph BATCH PLANT. Final acceptance of any piece of plant is subject to satisfactory performance during operations.

Soil Cement Production; G, RE.

Descriptions and details for all methods and operations proposed for soil

cement operation including daily and weekly production rates, shall be submitted for review and approval for conformance with specifications.

Curing; G, RE.

The curing media and methods to be used to keep soil cement surfaces continually moist until subsequent layers of soil cement are placed shall be submitted for review and approval to the Contracting Officer 5 days before soil cement placement begins for conformance with paragraph CURING AND PROTECTION.

Placing During Cold Weather.

When soil cement is to be placed under cold-weather conditions, a description of the materials and methods proposed for protection of the soil cement meeting the requirements of paragraph COLD-WEATHER PROTECTION, shall be furnished to the Contracting Officer for review 5 days in advance of anticipated need date.

Placing During Hot Weather.

When soil cement is to be placed under hot-weather conditions, a description of the materials and methods proposed for protection of the soil cement meeting the requirements of paragraph HOT-WEATHER PROTECTION, shall be furnished to the Contracting Officer for review 5 days in advance of anticipated need date.

SD-03 Product Data

Waybills and Delivery Tickets.

Copies of waybills or delivery tickets for cementitious material during the progress of the work shall be submitted for review. Before the final payment is allowed, waybills and certified delivery tickets shall be furnished for all cementitious material used in the construction.

SD-07 Certificates

Nuclear Density Gauge Operators; G, RE.

Copies of permits and licenses for gauge operation; copies of certification of training for all operators shall be submitted for review and approval by the Contracting Officer.

Cementitious Materials; G, RE.

Cementitious materials including cement and pozzolan, will be accepted on the basis of the manufacturer's certification of compliance, accompanied by mill test reports that materials meet the requirements of the specification under which they are furnished. No cementitious materials shall be used until notice of acceptance has been given by the Contracting Officer. Cementitious materials will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under

the supervision of the Government at its expense.

1.5 MATERIAL DELIVERY, STORAGE, AND HANDLING

1.5.1 Cementitious Materials

1.5.1.1 Transportation

When bulk cement or pozzolan is not unloaded from primary carriers directly into weather-tight hoppers at the batching plant, transportation from the railhead, mill, or intermediate storage to the batching plant shall be accomplished in adequately designed weather-tight trucks, conveyors, or other means that will protect the material from exposure to moisture.

1.5.1.2 Storage

Cementitious materials shall be furnished in bulk. Immediately upon receipt at the site of the work, all cementitious materials shall be stored in a dry, weather-tight, and properly ventilated structure. All storage facilities shall permit easy access for inspection and identification. Sufficient materials shall be in storage to sustain continuous operation of the mixing plant while the soil cement is being placed. In order that cement may not become unduly aged after delivery, the Contractor shall use any cement that has been stored at the site for 60 days or more before using cement of lesser age.

1.5.2 Aggregate

1.5.2.1 Storage

Aggregate shall be stored adjacent to the mixing plant and shall remain in free-draining storage for at least 24 hours immediately prior to use. Sufficient aggregate shall be maintained at the site at all times to permit continuous placement.

1.5.2.2 Handling

Aggregate shall be handled in a manner to prevent segregation or degradation. Vehicles used for stockpiling or moving aggregate shall be kept clean of foreign materials.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

2.1.1.1 Portland Cement

Portland cement shall conform to ASTM C 150, Type V, low alkali.

2.1.1.2 Pozzolan

Pozzolan shall conform to ASTM C 618, Class F, with loss on ignition

limited to 6 percent.

2.1.1.3 Temperature of Cementitious Materials

The temperature of the cementitious materials as delivered to the site shall not exceed 65 degrees C.

2.1.2 Water

Water for mixing and curing soil cement shall be free from injurious amounts of oil, acid, salt, alkali, organic matter, or other deleterious substances and shall comply with COE CRD-C 400.

2.1.3 Aggregate

The aggregate used in the soil cement mixture shall not contain any material retained on a 37.5-mm sieve, nor any deleterious material. Aggregate shall be obtained from sources specified herein and stockpiled at the job site. Prior to using the aggregate stockpile, it shall be analyzed by laboratory tests in order to determine the job mix as set forth in paragraph MIX DESIGN.

2.1.3.1 Aggregate Source

Soil cement aggregates may be furnished from any source capable of meeting the grading requirements stated in paragraph GRADATION. Aggregates may be obtained from commercial sources, required excavation, or from borrow areas approved by the Contracting Officer. It is the responsibility of the Contractor to blend and/or process aggregates, or to import suitable materials from other sources approved by the Contracting Officer so that aggregate used in construction of soil cement conforms to the gradation requirement. The Contractor shall make all arrangements and secure all necessary permits for the procurement, furnishing, and transporting the soil cement aggregate.

2.1.3.2 Gradation

Aggregate for use in soil cement construction, when tested in accordance with ASTM C 136 and ASTM C 117, shall conform to the following gradation and be free of any deleterious material.

<u>Standard Sieve Size</u>	<u>Percent Passing by Weight</u> ^{1, 2}
37.5 mm	98-100
4.75 mm	60-90
1.18 mm	40-70
75-um	5-15

NOTE:

1. The maximum plasticity index shall be limited to 3 when determined in accordance with ASTM D 4318.
2. Clay and silt lumps larger than 12.5-mm shall be unacceptable, and screening will be required whenever this type of material is encountered.

Blending of aggregate for soil cement by combining aggregates from separate stockpiles shall be performed by utilizing separate storage feed bins at the plant to the satisfaction of the Contracting Officer.

2.1.4 CURING MATERIALS

Burlap shall conform to COE CRD-C 318.

2.2 MIXTURE PROPORTIONING

2.2.1 Composition

Soil cement shall be composed of cementitious materials, water, and aggregates. The cementitious material shall be portland cement in combination with pozzolan.

2.2.2 Proportions

Soil cement mixture proportions shall be based on laboratory test results submitted by the Contractor. Laboratory trials shall be performed by the Contractor in accordance with paragraph MIX DESIGN. The Contractor, as directed by the Government, shall incorporate the use of a pozzolan in the soil cement mixture and shall be proportioned to a maximum of fifteen (15) percent, by weight, of the total weight of cement.

2.2.3 Proportioning Responsibility

During the course of the work, the proportions will be changed as necessary by the Contracting Officer. Adjustments will be made to the batch weights, including cement, pozzolan, and water, to maintain the necessary consistency to prevent segregation within the soil cement and allow full compaction as determined. Frequent changes to the batch weights shall be considered usual and can be expected to occur frequently during the course of each day's placement depending on such variables as humidity, wind velocity, temperature, and cloud cover. Such changes will be as directed. The Contractor will be responsible for adjusting the added water to compensate for changes in aggregate moisture content.

2.2.4 Consistency

The Contracting Officer will determine at the placement site on a continuing basis the proper consistency necessary for adequate hauling, spreading, and compacting and will direct all necessary changes to achieve the proper soil cement consistency. Changes will be directed based on visual examination of the soil cement during the spreading and compaction process.

2.2.5 Mix Design

2.2.5.1 General

The Contractor will perform laboratory mix trials for the Contracting Officer to determine the job-mix proportions. Cement contents to be used for the laboratory trials will be at 7, 9, 11, and 13% of the total dry

aggregate. Prior to performing the laboratory testing, all materials including the type of cement, pozzolan, and source of aggregate shall be approved by the Contracting Officer. A new mix design will be required any time the Contractor requests a change in material, or proportioning of materials, from that given in the mix design.

2.2.5.2 Sampling of Stockpiles

The Contractor shall use equipment, approved by the Contracting Officer, capable to excavate a face for the full height of the stockpile at a minimum of six (6) different sampling locations around the perimeter of the stockpile. The same equipment shall then be used to channel the excavated face at each location from the bottom to the top in one operation. Material obtained shall be dumped on the ground in piles. The Contractor will then sample each of the sample piles by channeling it with a hand shovel at least four (4) locations around the perimeter. All samples obtained from the sample piles will then be combined into one composite sample for test purposes.

2.2.5.3 Testing Requirements

A series of tests, including sieve analyses, atterberg limits, and a mix design shall be conducted as specified herein.

2.2.5.4 Evaluation and Acceptance of Stockpile

During the determination of the job mix proportions of the soil cement for each stockpile, no material shall be used nor be added to the stockpile(s) being evaluated. Following the submittal of the laboratory test results, the Contractor shall allow the Contracting Officer at least seven (10) days to evaluate the results. After the evaluation period, the Government shall then provide the final job-mix proportions to the Contractor.

2.2.5.5 Determination of Moisture-Density

The Contractor shall perform optimum moisture-maximum density relationships in accordance with ASTM D 558, Method B.

2.2.5.6 Determination of Compressive Strength

Following the determination of optimum moisture and maximum density, the Contractor shall prepare two (2) compressive strength test specimens for each of the cement contents specified at age of 1, 7, and 28 days. Specimens shall be tested in accordance with ASTM D 1633, Method A. The compression test specimens prepared for each of the cement percentages shall have approximately the following moisture contents: 4 percent below optimum, 2 percent below optimum, optimum moisture, and 2 percent above optimum.

2.2.6 Stockpiling of Material

Whether obtained from a borrow source, required excavation, or from off-site sources, aggregates shall not be transported directly to the mixing plant. The aggregates shall be stockpiled on firm ground drained

and leveled, free of debris, trash, organic materials, and other objectionable or deleterious material. Stockpiles shall be constructed in layers not exceeding 1 meter in thickness. Ramps formed for the construction of stockpiles shall be of the same material as that being stockpiled, and will be considered a part of the stockpile. Soil aggregates taken from the stockpile shall be removed in such a manner that aggregate from several layers of the stockpile are combined in each layer and the gradation of the mixed-layer aggregate obtained is representative of that used in the mix design tests.

2.2.7 BEDDING MORTAR

2.2.7.1 General

Bedding mortar is to be used for achieving bond between soil cement lifts as indicated in paragraph JOINTS. No surfaces to receive a bedding mortar shall be covered with soil cement until the prepared surface has been inspected and approved by the Contracting Officer's Representative. In no case will the bedding mortar be allowed to dry from the sun and wind.

2.2.7.2 Bedding Mortar Mix

The bedding mortar mix design will be developed by the Contractor and will conform to the following requirements.

Aggregate for bedding mortar shall conform to the requirements of ASTM C 33 for washed concrete sand.

Parameter

Slump	200-250 mm
Cement Content	250-500 kg/m ³
Minimum Compressive Strength	20 MPa (28 days)

PART 3 EXECUTION

3.1 EQUIPMENT

3.1.1 Capacity

The mixing plant, placing, compaction, and cleanup systems shall have a capacity of at least 100 cubic meters per hour.

3.1.2 Mixing Plant

The mixing plant shall be a weigh-batch type or continuous type.

3.1.2.1 Location

The mixing plant shall be located at the site of the work, subject to the approval of the Contracting Officer.

3.1.2.2 Bins and Silos

Separate bins, compartments, or silos shall be provided for each of the cementitious materials. The compartments shall be of ample size and so constructed that the various materials will be maintained separately under all working conditions. All compartments containing bulk cement or pozzolan shall be separated from each other by a free-draining air space. The cement and pozzolan bins shall be equipped with filters which allow air passage but preclude the venting of cement or pozzolan into the atmosphere.

All filling ports shall be clearly marked with a permanent sign stating the contents.

3.1.2.3 Batch Plant

The batch plant requirements should meet the following requirements.

a. Batchers - Aggregate shall be weighed in separate weigh batchers with individual scales or may be batched cumulatively. Bulk cement and other cementitious materials shall each be weighed on a separate scale in a separate weigh batcher. Water shall be measured by weight or by volume. It shall not be weighed or measured cumulatively with another ingredient.

b. Water Batcher - A suitable water-measuring and batching device shall be provided that will be capable of measuring and batching the mixing water within the specified tolerances for each batch. The mechanism for delivering water to the mixers shall be free from leakage when the valves are closed. The filling and discharge valves for the water batcher shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed. When a water meter is used, a suitable strainer shall be provided ahead of the metering device.

c. Moisture Control - The plant shall be capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the masses of the materials being batched. A moisture meter complying with the provisions of COE CRD-C 143 shall be provided for measurement of moisture in the soil aggregate. The sensing element shall be arranged so that the measurement is made near the batcher charging gate of the aggregate hopper or in the aggregate batcher.

d. Scales - Adequate facilities shall be provided for the accurate measurement and control of each of the materials entering the soil cement. The weighing equipment and controls shall conform to the applicable requirements of NIST HB 44, except that the accuracy shall be within 0.2 percent of the scale capacity. The Contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring device. Tests shall be made at the frequency required in paragraph TESTS AND INSPECTIONS and in the presence of a Government inspector. Each weighing unit shall include a visible indicator that shall indicate the scale load at all stages of the weighing operation and shall show the scale in balance at zero load. The weighing equipment shall be arranged so that the concrete plant operator can conveniently observe the indicators.

e. Operation and Accuracy - The weighing operation of each material shall begin automatically when actuated by one or more starter switches and shall end when the designated amount of each material has been reached. These requirements can be met by providing a semiautomatic or automatic batching system as defined by the NRMCA CPMB 100. The weigh batchers shall be so constructed and arranged that the sequence and timing of batcher discharge gates can be controlled to produce a ribboning and mixing of the aggregates, water, and cementitious materials as the materials pass through the charging hopper into the mixer. The plant shall include provisions to facilitate the inspection of all operations at all times. Delivery of materials from the batching equipment shall be within the following limits of accuracy:

MATERIAL	PERCENT OF REQUIRED MASS
Cementitious materials	0 to +2
Water	<u>+1</u>
Aggregate.....	<u>+2</u>

When water is measured by volume, it shall meet the same tolerance percent as stated in the chart.

f. Interlocks - Batchers and mixers shall be interlocked so that:

- (1) The charging device of each batcher cannot be actuated until all scales have returned to zero balance within plus or minus 0.2 percent of the scale capacity and each volumetric device has reset to start or has signaled empty.
- (2) The charging device of each batcher cannot be actuated if the discharge device is open.
- (3) The discharge device of each batcher cannot be actuated if the charging device is open.
- (4) The discharge device of each batcher cannot be actuated until the indicated material is within the allowable tolerances.
- (5) The mixers cannot be discharged until the required mixing time has elapsed.

g. Recorder - An accurate recorder or recorders shall be provided and shall conform to the following detailed requirements:

- (1) The recorder shall produce a graphical or digital record on a single visible chart or tape of the weight or volume of each material in the batchers at the conclusion of the batching cycle. The record shall be produced prior to delivery of the materials to the mixer. After the batchers have been discharged, the recorder shall show the return to empty condition.
- (2) A graphical recording or digital printout unit shall be

completely housed in a single cabinet that shall be capable of being locked.

(3) The chart or tape shall be so marked that each batch may be permanently identified and so that variations in batch weights of each type of batch can be readily observed. The chart or tape shall be easily interpreted in increments not exceeding 0.5 percent of each batch weight.

(4) The chart or tape shall show time of day at intervals of not more than 15 minutes.

(5) The recorder chart or tape shall become the property of the Government.

(6) The recorder shall be placed in a position convenient for observation by the mixing plant operator and the Government inspector.

(7) The recorded weights or volumes when compared to the weights or volumes actually batched shall be accurate within plus or minus 2 percent.

h. Batch Counters - The plant shall include devices for automatically counting the total number of batches of all concrete batched and the number of batches of each preset mixture.

i. Batch Plant Trial Operation - Not less than 7 days prior to commencement of placing the test section, a test of the batching and mixing plant shall be made in the presence of a representative of the Contracting Officer to check operational adequacy. The number of full-scale soil cement batches required to be produced in trial runs shall be as directed, will not exceed 20, and shall be proportioned as directed by the Contracting Officer. All soil cement produced in these tests shall be wasted or used for purposes other than inclusion in structures covered by this specification. All deficiencies found in plant operation shall be corrected to the satisfaction of the Contracting Officer prior to the start of soil cement placing operations. The Contractor shall notify the Contracting Officer of the trial operation not less than 7 days prior to the start of the trial operation.

j. Protection - The weighing, indicating, recording, and control equipment shall be protected against exposure to dust, moisture, and vibration so that there is no interference with proper operation of the equipment.

3.1.2.4 Continuous Mixing Plant

A continuous mixing plant shall be capable of producing soil cement of the same quality and uniformity as would be produced in a conventional batch plant and shall be capable of producing a uniform continuous product (at both maximum and minimum production rates) that is mixed so that complete intermingling of all ingredients occurs without balling, segregation, and

wet or dry portions.

a. Operation and Accuracy - An electronic control system shall be provided. The control system shall have the capability of changing mixtures instantaneously, producing any of the mixtures at a variable rate, and tracking a mixture change to a hopper or a conveyor system. The control panel shall display for each ingredient the designed formula values and the instantaneous percentage values and shall record the instantaneous values at a preset time interval or on demand with a multiple copy printer/recorder. The recorder shall note formula changes and shall print total quantities of each ingredient and total amounts produced on command. There shall be weighing devices (belt scale or other) for continuous weighing of individual ingredients and total ingredients. The plant control shall not require manual devices to adjust the material flow. The plant shall be capable of total manual control operation for a single product at a limited production for short-time durations in the event of loss of electronic control. The electronic control system shall incorporate modular replaceable components to reduce down time in the event of control system malfunction. The aggregate shall have a device that monitors its moisture content immediately prior to dispensing into the mixing plant dispensing system. An inventory shall be maintained of such replaceable components. The accuracy of the plant dispensing systems shall be within the following limits:

Pozzolan	0 to +2 percent
Cement	0 to +2 percent
Water	<u>+1</u> percent
Aggregate.....	<u>+2</u> percent

The continuous feeders for each of the ingredients shall be calibrated as per the manufacturer's specifications. Devices and tools shall be maintained at the plant location to check the feeder's calibration at the Contracting Officer's request. A technician shall be provided that is skilled in calibration of the feed devices and the maintenance and repair of the plant control system. The technician shall be available within 30 minutes notice during all scheduled plant operations. The technician could be one or more of the Contractor's personnel.

b. Cement, Pozzolan, and Aggregate Feed - Cement, pozzolan, and aggregate shall be uniformly, continuously, and simultaneously fed (at the proper ratios and quantity for the mixture required) into the mixer by belt, auger, vane feeder, or other acceptable method. The feed bins or silos for each ingredient shall be kept sufficiently full and shall be of sufficient size to ensure a uniform flow at a constant rate for a specific mixture. The feed bins shall have a low-level indicator that both warns the operator and can shut the plant down if insufficient material is available for a uniform and continuous flow.

c. Liquid Dispenser - The liquid-dispensing device shall be capable of metering and dispensing within the specified requirements. The liquid valves shall be free from leakage in the closed position. The dispensers shall have attachments and/or be installed in such a manner that will permit convenient checking of their accuracy. Plumbing shall

be leak-free and properly valved to prevent backflow and siphoning. The dispenser shall be interlocked with the electronic plant control and shall warn the operator and shut down the plant if insufficient liquid is available.

d. Continuous Mixer - The continuous mixer shall have proper introduction of ingredients as specified by the manufacturer and shall not be charged in excess of the manufacturer's recommended capacity. Mixer shall be capable of combining the materials into a uniform homogeneous mixture and of discharging this mixture without segregation. The mixer shall operate at the blade speed designated by the manufacturer and shall be capable of changing retention time of the ingredients in the mixer. This should be accomplished by manually resetting the mixer blade angles. Mixing time (ingredient retention time in the mixer) shall be predicated upon the uniformity, homogeneity, and consistency of the resultant mixture. The mixer shall be maintained in satisfactory operating condition and mixer blades shall be kept free of hardened soil cement. Should mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired. Suitable facilities shall be provided for obtaining representative samples of soil cement for testing. All necessary platforms, shelters, tools, labor, and equipment shall be provided for obtaining samples.

e. Segregation - A means shall be used to reduce and minimize segregation and waste which would otherwise result from the continuous stream of soil cement being fed into the batch haul devices (dump trucks, etc.). The equipment shall retain the soil cement between tracks or other means of transport to prevent the need for stopping the mixer. These devices could include, but not be limited to, a discharge hopper having a capacity of at least 20 metric ton. The hopper shall be equipped with dump gates to assure rapid and complete discharge without segregation.

f. Trial operation - Not less than 7 days prior to commencement of placing the test section, a test of the plant shall be made in the presence of a representative of the Contracting Officer to check operational adequacy. The number of cubic meters required to be produced in trial runs shall be as directed, but will not exceed 100 cubic meters and shall be proportioned as directed by the Contracting Officer. All soil cement produced in these tests shall be wasted or used for purposes other than inclusion in structures covered by this specification. All deficiencies found in plant operation shall be corrected to the satisfaction of the Contracting Officer prior to the start of soil cement placing operations. The Contractor shall notify the Contracting Officer of the trial operation not less than 7 days prior to the start of the trial operation.

g. Protection - The weighing, indicating, recording, and control equipment shall be protected against exposure to dust, moisture, and vibration so that there is no interference with proper operation of the equipment.

3.1.1.3 Mixers

Mixers shall be stationary mixers or pugmill mixers. Mixers may be batch or continuous mixing. Each mixer shall combine the materials into a uniform mixture and discharge this mixture without segregation. Mixers shall not be charged in excess of the capacity recommended by the manufacturer on the nameplate. Excessive overmixing requiring additions of water will not be permitted. The mixers shall be maintained in satisfactory operating condition. Mixer blades or paddles shall be replaced when worn down more than 10 percent of their depth when compared with the manufacturer's dimension for new blades. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired or replaced.

3.1.3.1 Pugmill Mixers

A batch or continuous mixing twin-shaft pugmill mixer shall be capable of producing soil cement of the same quality and uniformity as would be produced in a conventional plant that meets all the requirements of these specification. All pugmill mixers shall meet the requirements of paragraph CONTINUOUS MIXING PLANT.

3.1.4 Transporting Equipment

The transporting equipment shall conform to the following requirements.

The concrete mixtures (soil cement and bedding mortar) shall be transported from the plant mixer(s) to placement as rapidly and as continuously as practical by methods which limit segregation, contamination, and surface drying. The soil cement shall be hauled from the mixing plant to the placing site in dump trucks equipped with protective covers.

3.1.5 Spreading Equipment

The spreading equipment shall conform to the following requirements:

The primary spreading procedure shall be accomplished by dozer. Graders or other equipment not specified may be used to facilitate the soil cement spreading process only when approved. The equipment shall be maintained in good operating condition. The equipment shall not leak or drip oil, grease, or other visible contaminants onto the soil cement surface. All equipment used for spreading that leaves the surface of the structure for maintenance or repairs or, for any other reason, must be cleaned of all contaminants by an approved method before returning to the structure surface. Under no conditions shall a dozer or other tracked vehicle be operated on other than fresh uncompacted soil cement except to facilitate startup operations for each lift and by approved procedures.

3.1.6 Compaction Equipment

The compaction equipment shall conform to the following requirements.

3.1.6.1 Primary Rollers

Self-propelled vibratory rollers shall be used for primary rolling. They

shall transmit a dynamic impact to the surface through a smooth steel drum by means of revolving weights, eccentric shafts, or other equivalent methods. The compactor shall have a minimum gross mass of 9,000 kg and shall produce a minimum dynamic force of 60,000 N/m of drum width. The operating frequency shall be variable in the approximate range of 1,700 to 3,000 cycles per minute. The amplitude shall be adjustable between 0.4 and 1.0 mm. The roller shall be capable of full compaction in both forward and reverse directions. The roller shall be operated at speeds not exceeding 0.7 m/s. Within the range of the operating capability of the equipment, the Contracting Officer may direct or approve variations to the frequency, amplitude, and speed of operation which result in the specified density at the fastest production rate.

3.1.6.2 Small Vibratory Rollers

Small vibratory rollers shall be used to compact the soil cement where the larger vibratory rollers specified above cannot maneuver. The rollers shall compact the soil cement to the required density and shall be so demonstrated during construction of the test section. Small vibratory rollers cannot compact the soil cement to the same density and thickness as the primary rollers; therefore, when small rollers are used, total lift thickness of the soil cement layer or lift shall be reduced to not over 150 mm uncompacted thickness to permit adequate compaction. Rollers shall have independent speed and vibration controls and shall be capable of a wide range of speed adjustments.

3.1.6.3 Tampers (Rammers)

The tampers shall compact the soil cement to the required density and shall be so demonstrated during construction of the test section. Tampers cannot compact the soil cement to the same density and thickness as the primary rollers; therefore, when tampers are used, thickness of each soil cement layer that is to be compacted shall be reduced to not more than 150 mm uncompacted thickness to assure adequate compaction.

3.1.7 Other Motorized Equipment

All other equipment necessary for the successful completion of soil cement production, but not previously discussed within these specifications (or determined to be necessary during the course of the work), shall be approved prior to actual use. Such equipment shall not result in any damage to the soil cement, shall be maintained in good operating condition, and shall be operated by skilled Contractor-provided personnel.

3.1.8 Nuclear Density Gauge

Tests to determine the density of the compacted soil cement shall be made by the Contractor using a single-probe nuclear density gauge supplied by the Contractor. The nuclear density gauge shall meet the applicable requirements of ASTM C 1040. The gauge shall be capable of taking readings along a horizontal path between the probes at 50-mm increments from 50 mm from the surface to 250 mm below the surface. The gauge and operator shall be made available to the Government until completion of all soil cement production at no additional cost. The Contractor shall obtain all permits

and certifications for the equipment and the operators.

3.1.9 Calibration

Nuclear gauge shall have been factory calibrated within 6 months of soil cement placement. The Contractor shall construct, at no additional costs to the Government, one (1) calibration test block using soil cement materials and proportions representative of those to be used during construction. The block shall be fabricated before the test section construction begins. The blocks size shall be a minimum of 450 mm by 450 mm by the maximum thickness of one lift, plus 50 mm. The blocks shall be compacted between 98 and 100 percent of the maximum wet density, which will be determined by the Contractor in accordance with ASTM D 558. The moisture content of the soil-cement used to fabricate the blocks may be increased just enough to facilitate compaction of the mixture, as long as the proportions of the dry materials remain constant and the required density is achieved. The blocks shall be measured and weighed to determine the actual density (unit weight) and shall be used to check the calibration of the nuclear density gauge. After drilling a hole in the block to accommodate the nuclear density gauge probe, three full depth nuclear density gauge tests shall be performed in the direct transmission mode and the results averaged. This average nuclear density gauge reading shall be compared with the measured unit weight of the block and the difference used as a correction factor for all readings taken that day. All measuring and weighing of the test block and all calibration checking of the density gauge shall be performed in the presence of a representative of the Contracting Officer. Calibration checks of the density gauge shall be made at the beginning of construction every day. Gauge calibration constants shall be adjusted for performance on the block at least 7 days prior to the evaluation of test sections. The Contractor shall remedy any inconsistencies in gauge performance prior to the start of soil cement placement. The block shall be used each day before placing begins to calibrate the full-depth readings of the nuclear density gauges used by the Contractor and the Government. The calibration block shall be available for use by the Government as needed.

3.1.10 Nuclear Density Gauge Operators

Prior to operations with the Nuclear Density Gauge, copies of permits and licenses for gauge operation and copies of certification of training for all operators shall be submitted for review and approval by the Contracting Officer.

3.2 SUBGRADE PREPARATION

Previously constructed underlying material shall be conditioned as specified in Section 02300 EARTHWORK. The existing subgrade, other than specified fills, shall be scarified, conditioned to optimum moisture content, and compacted to at least 95 percent of maximum density in accordance with ASTM D 1557 for a depth of least 150 mm. In all cases prior to placing soil cement, deficiencies in the underlying material shall be corrected, and the surface shall be cleaned and moistened, as directed. The surface of the underlying material will be approved by the Contracting Officer.

3.3 PREPARATION FOR PLACING

3.3.1 Placing Schedule

Contractor shall submit Placement Plan. Before starting soil cement production, a detailed schedule shall be submitted indicating intended daily and weekly production rates that, when followed, will meet the beginning and ending specified soil cement production dates. After initiation of soil cement production, the Contractor's schedule shall be updated and adjusted on a weekly basis for the duration of the soil cement placement. If it becomes apparent for any reason that the Contractor is not pursuing a schedule that will meet the specified soil cement production dates, actions necessary to increase the production rate shall be taken so that production is once again on schedule, within 5 calendar days after written notice. Also, if not back on schedule by the end of the 5 days calendar period, the Government reserves the right at this time to direct the Contractor, at no additional cost to the Government, to increase the amount and size of crews and equipment.

3.3.2 Aggregate Production Schedule

Aggregate production and stockpiling shall begin and shall be producing acceptable material by not later than 45 days in advance of the time when placement of the soil cement test section is expected to begin. At least 25 percent of the soil aggregates necessary for the completed soil cement construction shall be manufactured and stockpiled prior to start of placement of soil cement.

3.3.3 Test Section

3.3.3.1 General

Prior to placement of any soil cement, the Contractor shall construct a test section. The purpose of the test section is to demonstrate the suitability of the Contractor's equipment, methods, and personnel. The test section shall be at least 3 lifts in height and be at least 15 meters long and 3 meters wide. **The bottom lift shall have two adjoining lanes at 3 meters wide each.** The site of the test section shall be approved. After evaluation and assessment of the test section by the Contracting Officer, the Contractor shall dispose of the test section in an approved manner. Under no circumstances shall the test section be incorporated into or become a part of the permanent soil cement structure. The test section shall demonstrate sustained plant production rates, and batching, mixing, transporting, spreading, and compaction procedures. The date of the test section construction shall be provided at least 7 days in advance.

3.3.3.2 Test Section Requirements

The Contractor shall demonstrate the joint preparation, placement procedure for bedding mortar, rolling method for both fresh and cold construction joints, start-up and finishing procedures, testing methods, and plant operations. Variable amplitudes of the roller shall be used as approved in different areas to identify the optimum amplitude. Variations in mixture

proportions other than water shall be made if directed. The test section shall be placed in portions as directed by the Government. Additionally, at least three (3) nuclear gauge readings at the last lift of the test section shall be provided from points selected by the Government. The Contractor shall vary the water content, as necessary, to arrive at the appropriate content, subject to the approval of the Contracting Officer's Representative. The mixing plant shall be operated and calibrated prior to placing the test section. The Contractor shall use the same equipment, materials, and construction techniques on the test section as will be used in all subsequent work. Sub-grade preparation, soil-cement production, placing, compacting, curing, construction of joints, and all testing shall be in accordance with applicable provisions of this section of the specification.

3.3.3.3 Evaluation of Test Section

The Contractor shall not begin soil cement operations for the permanent structure until testing and evaluations by the Government have been completed, and it has been demonstrated to the satisfaction of the Contracting Officer that all specification requirements were met. Following completion of test section construction, 10 calendar days shall be allowed for testing and evaluations. If the Contractor does not meet requirements as specified, an additional test section or sections shall be constructed at no additional cost to the Government. The Contractor shall provide six (6) 152.4-mm diameter cores for full depth to the Government from points selected in the test section by the Government 7 days after completion of the test section.

3.3.4 Weather

If unusual adverse weather, such as heavy rain, severe cold, high winds, etc., occurs or is forecast to occur during placement, the placement operation shall be suspended until conditions improve.

3.3.4.1 Placing During Cold Weather

In cold-weather placement the soil cement shall not be placed when the ambient air temperature drops below 0 degrees C. If the ambient air temperature does drop below 0 degrees C, the surface of any recently placed (within the previous 72 hours) and exposed soil cement surface shall not remain exposed for more than 4 hours. Surfaces that will be exposed for longer times shall be protected as specified in paragraph COLD-WEATHER PROTECTION as a measure to maintain soil cement temperatures above 0 degrees C until after the ambient air temperature rises to above 0 degrees C and is expected to remain above 0 degrees C until the end of the curing and protection period, or until covered by another lift.

3.3.4.2 Placing During Rain

Soil cement shall not be placed during rainfall of 2.5 mm/hr or more. During periods of lesser rainfall, placement of soil cement may continue if, in the opinion of the Contracting Officer, no damage to the soil cement is occurring. Work shall commence only after excess free surface water and contaminated paste or soil cement have been removed and the surface has

gained sufficient strength (no less than 4 hours after the soil cement placement was suspended) to prevent rutting, pumping, intermixing of rainwater with the soil cement, or other damage to the soil cement. When the soil cement surface has been contaminated or damaged in any manner, the soil cement surface shall be washed to break up and remove laitance and/or mud-like coatings from the surface. All waste shall be removed and disposed of in an approved manner.

3.3.4.3 Placing During Hot Weather

During periods of hot weather when the maximum daily air temperature is likely to exceed 30 degrees C, the following precautions shall be taken. The temperature of the soil cement shall be controlled so that it does not exceed 30 degrees C when placed. Placement shall be suspended as soon as the soil cement temperature exceeds 30 degrees C. Measures that can be taken to prevent temperatures exceeding 30 degrees C include, but are not limited to, chilling mixing water, use of a canopy to shade the soil cement placement areas, placing during nighttime and early morning hours, or restricting placements to cloudy days. Use of any of these systems shall not be reason for extension of completion dates specified in these specifications.

3.3.5 Surface Preparation

3.3.5.1 Cleaning

Lift surfaces shall be cleaned prior to placing any additional soil cement thereon. Surface treatment shall be in accordance with the requirement of paragraph JOINTS. No surfaces to receive bedding mortar shall be covered with soil cement until the prepared surfaces have been approved by a Contracting Officer's Representative. All surfaces upon which soil cement or any bedding mortar is placed shall be moist (but contain no visible free water). Prior to placing soil cement, all surfaces shall be clean and free of loose, unkeyed, or deteriorated rock; all mud and silt accumulations; vegetation; laitance; puddles or ponds of free surface water; coatings; and any other detrimental materials. High-pressure water jetting, and/or wet sandblasting, followed by mild high-volume, low-pressure washing, shall be used on all hardened surfaces (cold joints) as necessary for the removal of laitance, coatings, stains, or other difficult-to-remove contaminants. High-volume low-pressure water washing and/or water jetting may be used for removal of loose materials. Adequate equipment with operators shall be on hand at the site to clean all surfaces in conformance with these specifications without disrupting in any way the soil cement production as scheduled.

3.3.5.2 High-Volume Low-Pressure Washing

Washing of loose materials can be accomplished with high-volume low-pressure water washing and/or air water jetting using equipment of similar design to that used in large-scale foundation cleanups. The air-water jets shall have 40-mm nozzles, a water supply of at least 2 L/s, and compressed air at the jet of 550 to 850 kPa. The low-pressure water jets shall have 25-mm nozzles available and a capacity of at least 13 L/s for truck-mounted devices.

3.3.5.3 High-Pressure Water Jet

A stream of water under a pressure of not less than 10.3 MPa shall be used for cleaning all cold joint surfaces, or surfaces with laitance, mortar coatings, stains, or other difficult-to-remove contaminants. There shall be no undercutting of coarse-size aggregates. Aggregate particles that are undercut shall be removed.

3.3.5.4 Wet Sandblasting

This method may be used when the soil cement has reached sufficient strength to prevent undercutting of coarse aggregate particles. Wet sandblasting shall be continued until all accumulated laitance, coatings, stain, or other difficult-to-remove contaminants are removed. Wet sandblasting may be used in lieu of or in combination with the high-pressure water jet.

3.4 PLACING

3.4.1 Procedures

The soil-cement mixture shall be placed and distributed in such a manner as to produce a reasonably smooth, uniform surface in layers of such uncompacted thickness that when compacted each layer shall not exceed 150 mm in thickness. Soil cement shall be placed in an up and down fashion along the slope face. The Contractor is encouraged to place and compact each successive layer as rapidly as possible after the preceding layer is completed and meet the density requirement. Placing of mixture shall be as nearly continuous as possible, with an absolute minimum of stops and starts; speed of placing shall be controlled, to permit proper rolling. Placing shall be discontinued during rain except for light mists which do not cause intermixing of cement and water slurry on the surface. Placing shall be done in a pattern so that curing water from previous placements will not pose a runoff problem on the fresh surface. The Contractor shall use care to minimize the production of cold joints.

3.4.2 Bedding Mortar

3.4.2.1 General

The bedding mortar shall be applied to the existing surface following any required cleanup. The bedding mortar shall be applied not more than 20 minutes ahead of soil cement placement, unless otherwise approved. The bedding mortar shall be used between soil cement lifts where cold joints occur and other horizontal and vertical contact surfaces. The bedding mortar shall have an average thickness after application of between 6 and 13 mm and shall cover 100 percent of the lift area. On vertical surfaces and cold joints, the bedding mortar shall be brushed. Placing temperature of the mortar shall not exceed 30 degree C when measured in accordance with ASTM C 1064/C 1064M.

3.4.2.2 Time Interval Between Mixing and Placing

Bedding mortar shall be placed within 30 minutes after discharge into nonagitating equipment. When mortar is truck-mixed or when a truck mixer or agitator is used for transporting mortar mixed by a concrete plant mixer, the mortar shall be delivered to the site, and discharge shall be completed within 1.5 hours after batching.

3.4.3 Lift Thickness

The lift thickness after final compaction by the vibratory roller shall be 150 mm.

3.4.4 Depositing, and Spreading

After the soil cement has been deposited, the soil cement shall be spread by dozers into gently sloping layers, that will, after final compaction of the layers by the vibratory roller, result in the specified lift thickness.

In no case shall the soil cement or bedding mortar be allowed to dry. Under no conditions shall a dozer or other tracked vehicle be operated on other than fresh uncompacted soil cement except at the start of each lift placement to facilitate startup operations, and then only by an approved procedure. No soil cement shall be placed on a previous lift which has not met specification. Unacceptable material shall be removed.

3.5 COMPACTION

After spreading and working with the dozer(s), the top surface of each lift shall be compacted with a self-propelled vibratory roller operating in the vibratory mode as are required to obtain the minimum compaction specified. A round trip over the same material shall count as two passes (i.e., from point A to point B and return to point A by the same route is two passes). Rolling shall begin within 10 minutes of spreading and, except for fresh joints, rolling shall be completed within 45 minutes of start of mixing, except during hot or dry weather conditions, as described in paragraph Placing During Hot Weather. In hot or dry weather, rolling shall begin within 5 minutes of spreading, and except for joints, rolling shall be completed within 30 minutes of start of mixing. Delays in rolling freshly laid mixture will not be permitted. Rollers shall not be operated in the vibratory mode when not moving. The frequency and amplitude of vibration shall be varied, as needed or directed, within the range specified in paragraph EQUIPMENT. Surfaces of roller drums shall be kept clean at all times. At no time shall water be added during compaction operations to the uncompacted soil-cement mixture. If in the opinion of the Contracting Officer, the surface of a layer of soil-cement has been rutted or compacted unduly by hauling equipment so as to reduce the effectiveness of compaction by the specified rollers, the Contractor will be required to scarify such surfaces as directed prior to compacting with the specified rollers. At the start of compaction, the mixture shall be in a uniform, loose condition throughout its full depth. Compaction of each layer shall be done in such a manner as to produce a dense surface.

3.5.1 Required Compaction Density

Each layer shall be compacted to a density of at least 98 percent maximum density in accordance with ASTM D 558, Method B. The specified moisture

content shall be maintained uniformly throughout the layer of material being compacted.

3.5.2 Density Determination of Compacted Soil Cement

Density shall be measured using a nuclear density meter in accordance with ASTM C 1040. Soil cement density value determinations shall be made throughout the course of soil cement placement to assure that the soil cement is compacted to the minimum density specified and detect segregation and/or voids throughout the soil cement.

3.6 JOINTS

Joints shall be perpendicular to the finished grade of the soil cement. Joints shall be straight and continuous from edge to edge. Transverse construction joints shall be made to ensure continuity in smoothness and grade between old and new sections of soil cement, as specified hereinafter. All joints shall have the same texture and full-depth density. Regardless of age, contact surfaces of previously constructed lifts that have become coated with dust, sand, or other objectionable material shall be cleaned by brushing or cut back with approved power saw, as directed.

3.6.1 Lift Joint

The entire soil cement shall be placed with sufficient continuity so that it hardens and acts as one monolithic structure without discontinuous joints or potential planes of separation. All lift joints shall be kept clean, uncontaminated, free from ponded water, and continuously moist until placement of the succeeding soil cement.

3.6.1.1 Lift Placed Within 4 Hours

Regular lift-joint treatment and maintenance applies to subsequent lifts placed within 4 hours of the previous lift and shall include:

- a. Maintaining 100 percent of each compacted lift-joint surface continuously moist by application of water.
- b. If necessary, removing all loose contaminants or deteriorated soil cement by low pressure washing and vacuuming, air-jetting, or by the methods and procedures in paragraph SURFACE PREPARATION.
- c. During periods of hot weather as defined in paragraph Placing During Hot Weather, the time period for regular lift joint treatment shall be reduced to 2 hours. After 2 hours, the requirements of paragraph Lift Placed Within 4-8 Hours shall apply.

3.6.1.2 Lift Placed Within 4-8 Hours

When placement of the overlying lift does not occur within 4 hours the surface prior to placement shall be treated by air-water cutting.

- a. The air pressure used in the jet shall be 620 to 760 kPa (90 to 110

psi), and the water pressure shall be just sufficient to bring the water into effective influence of the air pressure. After cutting, the surface shall be washed and rinsed until the wash water is no longer cloudy. Surfaces shall be inspected and approved by the Contracting Officer.

b. During periods of hot weather as defined in paragraph Placing During Hot Weather, the time period shall be reduced to 4 hours. After 4 hours the requirements of paragraph Lift Placed More Than 8 Hours shall apply.

3.6.1.3 Lift Placed More Than 8 Hours

When placement of the overlying lift does not occur within 8 hours the surface prior to placement shall be treated by air-water cutting as indicated in paragraph Lift Placed Within 4-8 Hours and/or by the methods and procedures in paragraph SURFACE PREPARATION. Following this initial preparation the cold-joint surface shall be kept continuously moist until the application of a bedding mortar. During periods of hot weather as defined in paragraph Placing During Hot Weather, the time period shall be reduced to 4-hours.

3.6.2 Construction Joints

When a transverse construction joint is required, the roller shall pass over the end of the freshly placed soil cement. In these cases, the previously placed materials shall be cut to full depth of the lift, and the excess material removed. Transverse joints may also be formed by using bulkheads and forms to provide a full-depth vertical face. This vertical face shall be dampened before the placement of the fresh lift begins. When necessary, the fresh mixture shall be hand finished at the joints. Additional rolling shall be used to assure that specified full-depth density and surface finish is attained.

3.6.3 Longitudinal Joints

Any construction joints in which the edge of the initial strip has exceeded the time requirements given in paragraph JOINTS shall be considered "cold joints" and shall be trimmed by cutting back into the complete lift to form a full-depth vertical face and the excess material removed. This vertical face shall be dampened before the placement of the fresh lane begins.

3.7 CURING AND PROTECTION

3.7.1 Curing

Temporarily exposed surfaces of soil cement that will be in contact with succeeding layers of soil cement shall be kept continuously moist by moist curing method described hereinafter until placement of the subsequent layer. Curing of permanently exposed surfaces shall begin immediately after compaction and shall continue for at least 14 days. Soil cement shall be cured and protected from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage and exposure to rain or flowing water. The Contractor shall have all equipment

needed for adequate curing and protection on hand and ready to install before actual placement begins. The curing medium and method, or the combination of mediums and methods used, shall be approved by the Contracting Officer. The soil cement shall be protected from the damaging effects of rain for 12 hours and flowing water for 14 days.

3.7.1.1 Moist Curing

Soil cement will be moist cured by maintaining all surfaces continuously, not periodically, wet for the duration of the entire curing period. Water for curing shall comply with the requirements of paragraph: WATER. If water is used which stains or discolors soil cement surfaces which are to be permanently exposed, the surfaces shall be cleaned to the satisfaction of the Contracting Officer. Horizontal surfaces may be cured by covering with a minimum uniform thickness of 150 mm of continuously saturated sand. Temporarily exposed surfaces may not be cured by saturated sand.

3.7.1.2 Truck Applications

Water trucks shall be used, as necessary, to keep surfaces moist at all times until a sprinkler system, wet burlap covering, or final curing method is implemented. The water truck shall be supplemented, as necessary, by mists from hand-held hoses. The truck operator shall be positioned so he is capable of seeing the spray at all times. The spray shall be capable of easy direction, either by attachment to the front of the truck so it can be directed by steering the truck or by other approved means. All spray nozzles both on the trucks and the hand held hoses shall be of a type that produces a true fog spray without any concentrated streams of water. The mist shall not be applied in a channelized or pressurized manner that in any way erodes the surface of the soil cement. It shall also be applied at a rate which does not cause ponding at the surface. Trucks shall not be allowed to drop visible oil or other contaminants on the surface. If trucks must leave the surface, the tires shall be washed free of dirt or other foreign material before returning to the surface. Water truck wheel loads shall not exceed 2,000 kg and shall be such that no cracking or other damage to the soil cement is caused.

3.7.1.3 Sprinkler System

An approved sprinkler system consisting of pipe lines and rotating or other approved type of sprinklers may be used. Sprinklers shall deliver a fine mist of water and shall not cause any erosion to the surface of the soil cement. The sprinkler system shall cover all portions of the soil cement surface, and keep the surface wet at all times.

3.7.1.4 Burlap

Burlap covers shall consist of two or more layers of burlap having a combined weight of 4,736 gram per square meter in a dry condition. Burlap shall be either new or shall have been used only for curing soil cement or conventional portland cement concrete. Burlap strips shall have a length after shrinkage of at least 300 mm greater than necessary to cover the entire width and edges of the soil cement. Mats shall overlap each other at least 150 mm. Mats shall be thoroughly wetted before placing and shall

be kept continuously wet and in intimate contact with the surface and edges of the area for the entire specified curing period.

3.7.2 Protection from Rain or Water Flow

If, prior to completion of compaction, the soil-cement mixture is wetted by rain or flowing water such that average moisture content exceeds the optimum moisture content specified by the mix design, at the time of final compaction, the entire layer affected, as determined by the Contracting Officer, shall be removed and shall be replaced in accordance with these specifications at the expense of the Contractor.

3.8 FINISHING SURFACE

After compaction to the required lines and grades as shown in the drawings, soil cement final surfaces shall be smooth and uniform and shall be free of surface pitting, voids or indentations, pockmarks, check cracking, segregation or rock pockets, aggregate drag marks, areas loosened by construction operations, and areas where fines have been washed away during curing process that are greater than 12.5 mm in depth. All holes left in the soil cement as a result of nuclear density testing shall be filled by the Contractor with a cement grout, as directed.

3.9 DISPOSAL OF UNSATISFACTORY MATERIALS

Any soil cement that is removed for the required correction of defective areas, waste material, and debris shall be disposed of as directed.

3.10 TESTS AND INSPECTIONS

3.10.1 General

The Contractor shall perform the inspection and tests as described below, and based upon the results of these inspections and tests, he shall take the action required and submit reports as required. When, in the opinion of the Contracting Officer, the soil cement operation is out of control, soil cement placement shall cease. The laboratory performing the tests shall conform to ASTM E 329. Any test results requested by the Government for review shall be provided to the Government immediately, and all results of every test by the Contractor shall be furnished to the Government on a daily basis, not later than the day after the test or inspection is made.

3.10.2 Testing and Inspection Requirements

3.10.2.1 Calibration of Mixing Plant

a. Batch-Mixing Plants: Accuracy of the batching equipment shall be checked for each type of cementitious material and aggregate at the beginning of operations and at least once for every 10 shifts in the presence of the Contracting Officer. Such checks shall also be made whenever there are variations in properties of the fresh soil cement which could be the result of batching errors. Standard test weights accurate to plus or minus 0.1 percent shall be provided for checking plant scales.

b. Continuous-Mixing Plants: Accuracy of proportioning of the continuous-mixing plant shall be checked for each cementitious material every day at the beginning of operations and for soil aggregate at the beginning of construction and after every 10 shifts. The accuracy of proportioning shall be checked by simultaneously securing timed samples of the cementitious materials and the soil aggregate as they are fed to the mixer and weighing each as appropriate.

c. Mixing Time: Mixing time of the pug mill shall be checked at the direction of the Government. Unless otherwise required, determination of mixing time shall be by weight method using the following formula:

Mixing time in seconds = pug mill dead capacity in kg/pug mill
output in kg per second

3.10.2.2 Aggregate Moisture Tests

a. Frequency of Tests - There shall be at least two tests for moisture content tests in accordance with ASTM C 566 or ASTM C 70 during each shift of mixing plant operation. The times for the tests shall be selected randomly within each shift. Additional tests shall be made whenever excessive variation in workability is reported by the placing foreman.

b. Corrective Action for Moisture Tests - When moisture content determinations indicate a change in water entering the mix with the aggregates, the placement foreman shall be notified to check if a corresponding adjustment in water added at the mixer is necessary to obtain adequate compaction and meet consistency requirements at the placement site.

3.10.2.3 Batched Aggregate

a. Grading - Before starting work, at least one sample of aggregate shall be tested in accordance with ASTM C 136 and ASTM C 117. The aggregate shall not be used unless results verify that the aggregate complies with the specified gradation and tolerances. After the initial test, a minimum of one analysis shall be performed for each 400 cubic meters or portion thereof of soil cement material placed each shift. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. Each time the Contractor performs a moisture-density relation, an additional gradation analysis in conformance with ASTM C 136 shall be performed, corresponding to the material used in the moisture-density relation.

b. Corrective Action for Grading - When deficiencies in grading are found, the rate of testing shall be increased as directed. When two consecutive tests show the aggregate to be deficient in grading, the mixing operation shall be stopped until acceptable material is furnished for delivery to the mixer.

3.10.2.4 Scales

- a. Weighing Accuracy - The accuracy of the scales shall be checked by test weights at least once a month for conformance with the applicable requirements of paragraphs BATCH PLANT and CONTINUOUS MIXING PLANT. Such tests shall also be made as directed whenever there are variations in properties of the fresh soil cement that could result from batching errors.
- b. Batching and Recording Accuracy - Once a week the accuracy of each batching and recording device shall be checked during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. The Contractor shall confirm that the calibration devices described in paragraph BATCH PLANT for checking the accuracy of dispensing units are operating properly. If a continuous mixing plant is provided, the accuracy and operation of all feeding and dispensing units shall be checked before the start of operation each day.
- c. Scales Corrective Action - When the weighing accuracy or batching accuracy does not comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made. Discrepancies in recording accuracies shall be corrected immediately.

3.10.2.5 Mixing Plant Control

The measurement of all constituent materials including cementitious materials, soil aggregate, and water shall be continuously controlled. The aggregate weight and amount of added water shall be adjusted as necessary to compensate for free moisture in the aggregates. A report shall be prepared indicating type and source of cement used, type and source of pozzolan used, and aggregate source, during plant operation.

3.10.2.6 Field Density

- a. Testing and Checking - Density shall be determined for each 250 square meters of completed lift, with a calibrated nuclear density gauge in accordance with ASTM C 1040. Additional tests shall be made, as directed, particularly during start-up and when problems with attaining the required density occur. Field density tests shall be performed as soon as possible, but within 30 minutes, after the completion of vibratory rolling. Each test shall include readings taken at incremental depths of 50 mm to depth of 100 mm. Only the deepest reading shall be used to evaluate the density. Both wet and dry densities shall be reported, and all individual readings shall be reported; however, only the wet density shall be used for evaluation.
- b. Action Required - Whenever the nuclear gauge indicates density less than the specified density, a retest shall be made. If the retest indicates unacceptable density, the Contracting Officer's Representative shall be notified, additional rolling shall be immediately provided, and a determination shall be made as to whether the lower density resulted from insufficient passes of the roller or a

change in the mix properties. If the mix properties have changed, adjustments such as increasing or decreasing the moisture content shall be made at the batch plant. If the problem persists, the Contracting Officer may adjust the proportions of aggregates, cement, and/or pozzolan. If the lower density is the result of incomplete rolling, the operator shall be notified and the Contracting Officer may require removal of the incompletely compacted material at no cost to the Government.

3.10.2.7 Moisture Tests of Mix

a. Testing and Checking - Moisture content of the soil cement mix shall be determined each time a density reading is taken with a calibrated nuclear gauge. The nuclear gauge shall be set to backscatter mode when determining moisture content. The calibration of the nuclear gauge shall be verified to oven dry materials at least once per five (5) shifts.

b. Corrective Action - The placing foreman shall continuously monitor the apparent effectiveness of compaction equipment from a visual standpoint, and shall notify the mixing plant whenever the mix becomes too dry or too wet. Whenever moisture content tests indicate a change from what has been established as the optimum batching and placing moisture for maximum density and efficiency of compaction equipment, an adjustment shall be made in the mix water added at the mixing plant and the adjustment shall be noted.

3.10.2.8 Coring Specimen

Cores shall be drilled by the Contractor from points in the soil cement to determine thickness within 7 days after placement. A minimum of two cores per days placement will be taken from locations selected in a random fashion by the Contracting Officer. Cores shall be 150 mm diameter and shall be obtained for the full depth of soil cement placement. All cores shall become the property of the Government and may be tested for strength determination or other properties as considered appropriate. Refilling of core holes shall be performed with portland cement mortar, using materials and procedures directed.

3.10.2.9 THICKNESS EVALUATION

The thickness of the soil cement will be determined by the Government on the basis of measurements made on cores drilled by the Contractor from locations outlined in paragraph CONTRACTOR QUALITY CONTROL. Measurements of individual cores will be performed in accordance with ASTM C 174/C 174M.

When the measurement of any core indicates that the soil cement is deficient in thickness by 25 mm or more, additional cores shall be drilled by the Contractor at 8 m intervals, on all sides of the deficient core until the cores indicate that the deficiency in thickness is less than 25 mm. If after the measurement of the additional cores still indicate a deficiency in thickness of 25 mm or more, the areas represented by those cores shall be removed and replaced with soil cement of the specified thickness at no additional cost to the Government. If the Contractor believes that the cores and measurement taken are not sufficient to

indicate fairly the actual thickness of the soil cement, additional cores shall be taken and will be measured provided the Contractor shall bear the extra cost of drilling the cores.

3.10.2.10 Inspection Before Placing

Construction joints and other horizontal surfaces shall be inspected by the Contractor in sufficient time prior to the next lift placement to certify to the Contracting Officer that they are ready to receive soil cement. The results of each inspection shall be reported in writing. The inspection of the lift surfaces of the soil cement will be a continuing activity and shall be accomplished in accordance with paragraphs SURFACE PREPARATION and JOINTS.

3.10.2.11 Inspection During Placing

a. Inspection - The Contractor shall provide full time supervision of all placing operations to insure that the correct quality of soil cement or bedding mortar are performed in accordance with the contract.

During placing operations, the quality control staff shall measure and record soil cement temperatures in accordance with ASTM C 1064/C 1064M, ambient temperature hourly, record weather conditions, time of placement, volume placed, and method of placement.

b. Cold-Weather Placing - At least once during each shift, an inspection shall be made of all areas subject to cold-weather protection. Deficiencies shall be noted. During removal of protection, the soil cement temperature and ambient temperature shall be measured at least hourly.

c. Hot-Weather Placing - When the maximum daily air is likely to exceed 30 degrees C, the Contractor shall take and record the temperature of the mixture at 30-minute intervals during hot-weather placement. The surface of the subgrade or soil cement shall be inspected to assure that it is sprinkled with water immediately before the next layer of soil cement is placed and any deficiencies noted.

d. Corrective Action - The placing foreman shall not permit soil cement placing to begin until he has verified that necessary equipment are all in working order and with competent operators. Placing shall not be continued if any lift of soil cement is not fully compacted.

e. Temperature Protection - The Contracting Officer shall be notified whenever the soil cement temperature during the period of protection or protection removal fails to comply with the specifications, and immediate steps shall be taken to correct the situation. Regardless of the ambient temperature, when the temperature of the soil cement mixture exceeds 32 degrees C, mixing and placing shall be stopped and the Contracting Officer notified.

3.10.2.12 Compressive Strength Tests

At least two compressive strength tests shall be conducted for each 500 cubic meter of soil cement placed. A "test" is defined as the average of

two companion soil cement specimens. Samples shall be taken from the wet batched mix. Tests shall determine the one (1) day and seven (7) day compressive strengths in accordance with ASTM D 1633, Method A except that curing of specimens in the mold will be required only for the length of time necessary to satisfactorily remove the specimens from the mold without damage to the specimens.

3.10.2.13 Curing Inspection

a. Moist Curing Inspections - At least twice each shift, and twice per day on nonwork days an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

b. Moist Curing Corrective Action - When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for those areas shall be extended by one day.

3.10.2.14 Cold-Weather and Hot-Weather Protection

At least once each shift and once per day on nonwork days an inspection shall be made of all areas subject to cold-weather or hot-weather protection. Any deficiencies shall be noted, corrected, and reported.

3.10.2.15 Cold-Weather and Hot-Weather Protection Corrective Action

When a daily inspection report lists deficiencies, the deficiency shall be corrected immediately and the period of protection extended for one day.

3.10.3 Reports

All results of tests conducted at the project site shall be reported daily and shall be delivered to a designated representative of the Contracting Officer. During periods of cold weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failure and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all Contractor quality control records at any time.

3.10.4 Waybills and Delivery Tickets

Copies of waybills or delivery tickets shall be submitted to the Contracting Officer's Representative, during the progress of the work. The Contractor shall furnish the Contracting Officer's Representative scale tickets for each load of material weighed; these tickets shall include tare weight, identification mark of each vehicle weighed, plus date, time, and location of the loading. Tickets shall be furnished at the point and time individual loads arrive at the work site. A master log of all vehicle loading shall be furnished for each day of loading operation. The Contractor shall file with the Contracting Officer's Representative the master log of loadings, certified waybills and/or certified tickets, within

24 hours of material delivery. Prior to the final payment, the Contractor shall furnish written certification that the material recorded on the submitted waybills and/or certified tickets was actually used in the construction covered by the contract.

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SECTION 05502

MISCELLANEOUS METAL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B16.11 (1996) Forged Steel Fittings, Socket
Welded and Threaded

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C105 (1999) Polyethylene Encasement for
Ductile-Iron Pipe Systems

AWWA C600 (1999) Installation of Ductile-Iron Water
Mains and Their Appurtenances

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2002) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 36/A 36M (2001) Carbon Structural Steel

ASTM A 48/A 48M (2000) Gray Iron Castings

ASTM A 53/A 53M (2002) Pipe, Steel, Black and Hot-Dipped,
Zinc-Coated, Welded and Seamless

ASTM A 123/A 123M (2002) Zinc (Hot-Dip Galvanized) Coatings
on Iron and Steel Products

ASTM A 126 (1995; R 2001) Gray Iron Castings for
Valves, Flanges, and Pipe Fittings

ASTM A 320/A 320M (2002) Alloy/Steel Bolting Materials for
Low-Temperature Service

ASTM A 467/A 467M (2001) Machine and Coil Chain

ASTM A 500 (2001a) Cold-Formed Welded and Seamless

	Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 653	(2002a) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 865	(1997) Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints
ASTM A 924/A 924M	(1999) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 32	(2000e1) Solder Metal
ASTM F 844	(2000) Washers, Steel, Plain (Flat), Unhardened for General Use
ASTM F 883	(1997) Padlocks

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-1923	(Rev A) Shield, Expansion (Lag, Machine and Externally Threaded Wedge Bolt Anchors)
CID A-A-60005	Frames, Covers, Gratings, Steps, Sump and Catch Basin, Manhole

DEPARTMENT OF PUBLIC WORKS, CLARK COUNTY, NEVADA (DPWCC)

DPWCC	Uniform Standard Drawings For Public Works' Construction Off-Site Improvements, Clark County Area Nevada
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STATE OF NEVADA DEPARTMENT OF TRANSPORTATION (NDOT)

NDOT	Nevada Department of Transportation Standard Plans For Road and Bridge Construction
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1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Miscellaneous Metal Items.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: Pipe Access Gates for Invert Access Ramps and Chain Safety Gates installation.

SD-11 Closeout Submittals

Satisfactory Installation.

A statement signed by the principal officer of the contracting firm stating that the installation is satisfactory and in accordance with the contract drawings and specifications, and the manufacturer's prescribed procedures and techniques, upon completion of the project and before final acceptance.

1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1/D1.1M. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123/A 123M, ASTM A 653, or ASTM A 924/A 924M, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.4 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

1.5 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.6 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

1.7 SHOP PAINTING

Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

1.8 UTILITY SYSTEM SLEEVES

This section also covers utility system sleeves crossing under flood control channels. All work shall conform to the specifications and drawings (including VTN drawings) provided herein. All work shall also conform to the Las Vegas Valley Water District Standard Plates, Drawings, Specifications and the "Uniform Design and Construction Standards for Water Distribution Systems," UDACS, latest edition, and to Southwest Gas standards as applicable. The Contractor shall have a copy of the manufacturer's recommendations for each material or procedure to be utilized available at the construction site at all times.

1.8.1 Sleeves sized 150 mm (6 Inches) or Larger

Sleeves shall be of the materials and dimensions as shown on the drawings, or as required by the utility company having jurisdiction (owner) for that particular utility.

1.8.2 Excavation, Trenching, and Backfilling

Excavation, trenching, and backfilling shall be in accordance with the applicable provisions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, except as modified herein.

1.9 HANDLING

Pipe and accessories shall be handled to ensure delivery to the trench in sound, undamaged condition, including no injury to the pipe coating or lining. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor in a satisfactory manner, at no additional cost to the Government. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be

inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Government. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

Materials indicated on the drawings or required in the work and not covered elsewhere by detailed requirements shall conform to the requirements of this section. In all cases not specifically covered in these specifications, the Contractor shall furnish approved highest grade commercial materials or products which are suitable for the intended use of the item.

2.1.2 Structural Shapes and Plates

Steel bars, shapes and plates shall conform to ASTM A 36/A 36M. Galvanized coatings where required, shall conform to ASTM A 123/A 123M.

2.1.2.1 Steel Gratings

Steel gratings shall be fabricated of steel conforming to ASTM A 36/A 36M per dimensions shown on drawings. Galvanizing shall conform to paragraph ZINC COATING.

2.1.3 Steel Pipes

Steel pipe shall be zinc-coated steel pipe conforming to the requirements of ASTM A 53/A 53M, Standard Weight, Schedule 40, nominal size unless noted otherwise.

2.1.3.1 Pipe Access Gate and Appurtenances

Pipe access gate and appurtenances shall be fabricated as shown on the drawings. Pipe access gates shall be fabricated in the shop from standard weight steel pipe conforming to ASTM A 53/A 53M or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Pipe access gates shall be 38 mm nominal size and all pipe access gate components (including nuts and washers) shall be hot-dip galvanized after fabrication.

Welded, cut, damaged, and deformed areas of galvanizing metal shall be neatly coated with Grade 50B solder conforming to ASTM B 32. Pipe collars shall be hot-dip galvanized steel.

2.1.3.2 Pipe Caps

Pipe caps shall conform to commercially available heavy duty pipe caps.

2.1.3.3 Pipe, Steel, for Utility Sleeve

Pipe, steel, for future utilities sleeves shall be steel pipe conforming to

ASTM A 53/A 53M, Class B, and to the dimensions and diameters shown on the drawings. Unless specified otherwise, the minimum thickness shall be 6 mm.

When installed underground, steel pipe shall be encased with 0.15 mm thick polyethylene in accordance with AWWA C105.

2.1.3.4 Pipe, Steel, Fittings

Pipe, steel, fittings, shall conform to ASTM A 865 or ANSI B16.11 as necessary.

2.1.4 Corrosion-Resisting Steel Bolts and Anchor Bolts

Corrosion-resisting steel bolts and anchor bolts shall conform to the applicable requirements of ASTM A 320/A 320M, Grade B8.

2.1.5 Bolts

Bolts and anchor bolts shall conform to the applicable requirements of ASTM A 320/A 320M, Grade B8.

2.1.6 Nuts

Nuts shall be galvanized and confirm to the applicable requirements of ASTM A 320/A 320M, Grade 8. Nuts shall be galvanized.

2.1.7 Expansion Anchors

Expansion anchors shall conform to the applicable requirements of CID A-A-1923. Anchors shall be multiple unit with inside thread.

2.1.8 Concrete, Mortar and Grout

Concrete, motar and grout shall conform to the requirements of Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE.

2.1.9 Chain Safety Gate

Safety chains shall be galvanized welded steel, proof coil chain tested in accordance with ASTM A 467/A 467M, Class CS. Safety chains shall be straight link style, 5 mm diameter, minimum 39 links per meter (12 links per foot) and with bolt type snap hooks on one end. Eye bolts for attachment of chains shall be galvanized 10 mm bolt with 19 mm eye, anchored as indicated. The safety chain shall accommodate a eye bolt snap as indicated on the drawings.

2.1.10 Wall ladder Rungs (Galvanized)

Wall ladder rungs shall be galvanized steel. Steel bars, shapes and plates shall conform to ASTM A 36/A 36M. Galvanized coatings shall conform to ASTM A 123/A 123M.

2.1.11 Washers

Washers shall confirm to ASTM F 844. Washers shall be galvanized.

2.1.12 Cover Plate

Cover plates shall conform to CID A-A-60005 or commercially available items meeting Contracting Officer approval. Sharp edges and burrs shall be removed from plates.

2.1.13 Manhole Frames and Covers

Manhole frame and cover for the basin stilling well is Alhambra Type A-1330, or equal. The manhole for the basin stilling well shall have a locking bar in accordance with the drawings. Other manhole frames and covers are to be Gray Iron Castings, Type A-1497 as manufactured by Alhambra Foundry Co. Ltd. or approved equal. Castings for manhole frames and covers shall conform to ASTM A 48/A 48M, Class 30. Frame and cover shall be machined to fit. Lids shall be imprinted with the words "Clark County Public Works Storm Drain".

2.1.14 Steel Chain Gate

Chain safety gate shall be manufactured from 6 mm diameter carbon steel coil in accordance with ASTM A 467/A 467M.

2.2 MISCELLANEOUS

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings, and frames, shall be provided to complete the work.

2.2.1 Square Beehive Drainage Gratings

Square beehive drainage gratings shall be in accordance with the drawings. Steel gratings shall be fabricated of steel conforming to ASTM A 36/A 36M per dimensions shown on drawings. Galvanizing shall conform to paragraph ZINC COATING.

2.3 TRENCH COVERS, FRAMES, AND LINERS

Trench covers shall be designed to meet the indicated load requirements. Trench frames and anchors shall be all welded steel construction designed to match cover. Covers shall have flush drop handles formed of 6 mm round stock, and shall be raised-tread, or steel floor plate. Trench liners shall be cast iron with integral frame for cover.

2.4 Cast Iron for Frames and Drainage Gates

Cast iron for frames and drainage gates shall conform to ASTM A 126, Class B.

2.5 PADLOCKS

Padlocks shall conform to ASTM F 883, Type P01 Grade 2. Padlocks shall be

a combination commercial type Padlock Master #175 or equivalent.

2.6 Stilling Well Ladder and Safety Cage

Ladder and cage shall be detailed and submitted for approval prior to fabrication. Full dimensions, wall and floor attachments, materials, construction and finish must be shown. All edges shall be clean, smooth, burr-free and rounded.

a. Rungs shall be no less than 31.7 mm in section and 466.7 mm long, formed from tubular aluminum extrusions, alloy 6063-T6 or 6005-T5, shall be squared and deeply serrated on all sides, and shall be at 305 mm intervals. Rungs shall be able to withstand a 450 kg load without failure.

b. Side rails shall be aluminum channel no less than 3.2 mm wall thickness by 76.2 mm wide.

c. Safety cage shall be fabricated from 4.8 mm by 50.8 mm aluminum bar, alloy 6063-T5 or 6005-T5. Cage hoops shall have 342.9 mm minimum radius. Safety cage shall end a minimum of 2.13 meters and a maximum of 2.44 meters above the bottom of the ladder.

d. Platform shall be provided at maximum interval of 9.144 meters with deck of serrated aluminum treads.

e. Wall mounting brackets shall be aluminum no less than 50.8 mm by 4.76 mm.

f. Floor mounting brackets shall be aluminum, angle, no less than 101.6 mm by 50.8 mm by 4.76 mm.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Items listed below require additional procedures as specified. Contractor shall submit detailed drawings of miscellaneous metal items. Detail drawings shall indicate material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: Pipe Access Gates for Invert Access Ramps, Stilling Well Ladder and Safety Cage, Stilling Well Metal Access Door with Hinge and Lock Box and Locking Bar for Manhole Access, and Chain Safety Gates installation. Items installed in roads under jurisdiction of the State of Nevada Department of Transportation shall be in accordance with NDOT requirements.

3.1.1 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce

clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Steel with welds will not be accepted, except where welding is definitely specified or called for on the drawings. All bolts, nuts, and screws shall be tight. Work shall be accurately set to established lines and elevations and securely fastened in place. Anchorage shall be provided where necessary for fastening miscellaneous metal and wood items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; machine and carriage bolts for steel; and lag bolts and screws for wood.

3.1.2 FINISHING

In general, tolerances for machine-finished surfaces designated by nondecimal dimensions shall be within 0.4 mm. Sufficient machining stock shall be allowed on placing pads to insure true surfaces of solid material.

Finished contacts of bearing surfaces shall be true and exact to secure full contact. All drilled holes for bolts shall be accurately located and drilled from templates.

3.1.3 ZINC COATING (GALVANIZING)

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123/A 123M. All exposed ferrous metalwork, except cast-iron and corrosion resistant steel and items to be completely embedded in concrete, shall be galvanized unless other protective coatings are specified. Metalwork shall be galvanized after fabrication. In the event that any portion of galvanized metalwork is abraded or otherwise damaged to the extent that the base metal is exposed, such damaged or abraded portions shall be neatly covered with Grade 50B solder conforming to the requirements of ASTM B 32.

3.1.4 WELDING

Welding shall conform to the provisions of AWS D1.1/D1.1M. Welders who have not been certified within two years of the date of commencement of work under this contract will not be allowed to perform the work.

3.1.5 BOLTED CONNECTIONS

Bolt holes shall be reamed normal to the member and shall be truly cylindrical throughout. Unless otherwise specified, holes for bolts shall not be more than 1.60 mm larger than the diameter of the bolt. Cutting bolt holes with a torch will not be permitted without the prior written approval of the Contracting Officer. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable.

3.1.6 EXCAVATION

Excavation for concrete-embedded items shall be of the dimensions indicated on the drawings. Holes shall be cleared of loose materials prior to

placement of concrete.

3.2 PIPE ACCESS GATE

Pipe access gates that restrict vehicle access into the channel invert shall be installed at the top of each of the invert access ramps as shown on the drawing for the Pipe Access Gate. Locations of the invert access ramps are indicated on the drawings. The pipe access gates shall be installed in such a fashion that they work freely. The Contractor shall examine the operation of all pipe access gates not sooner than 30 days after installation for ease of operation. Any pipe access gates that cannot be operated by one person will be repaired (including any required structural modifications) by the Contractor at no additional cost to the Government, and requirements for repair shall conform to the requirement for installation above. Contractor shall provide a padlock for each of the pipe access gate assemblies.

3.3 Mounting of Safety Chains for Chain Safety Gates

Safety chains shall be mounted 900 mm and 610 mm above the floor.

3.4 PAINTING

Painting of pipe access gates shall be in accordance with the requirements of the DPWCC, UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA, SECTIONS 614 AND SECTION 714.

3.5 Manhole and Channel Wall Ladder Rungs (Galvanized)

Manhole and channel wall ladder rungs and steps shall be installed in place during the structure construction process.

3.6 Steel Sleeves for Utilities

Steel sleeves for utilities shall be placed to the alignment and grades indicated and in accordance with this Section, and in accordance with SECTION 02316 EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES SYSTEMS, and in accordance with the drawings.

3.6.1 INSTALLATION

3.6.1.1 Excavation, Trenching for Pipe Sleeves

Excavation, trenching for pipe sleeves shall be in accordance with the applicable provisions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.6.1.2 Cutting of Pipe Sleeve Material

Cutting of pipe sleeve material shall be done in a neat and workmanlike manner without damage to the pipe sleeve. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved type mechanical cutter. Wheel cutter shall be

used when practicable.

3.6.1.3 Joints for Steel Pipe Sleeves

The maximum allowable deflection for the steel pipe sleeve joints shall be as given in AWWA C600 as it is anticipated that ductile-iron water mains will be installed in some of these pipe sleeves. Deflection in excess of the above limitations will not be allowed, nor will allowance be provided for special bends or angular deflections.

3.6.1.4 Placing and Laying Pipe Sleeves

Pipe sleeve and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Steel or PVC pipe sleeve materials shall not be dropped or dumped into the trench. Abrasion of the pipe sleeve coating when present shall be avoided.

Except where necessary in making connections with other lines or as authorized by the Contracting Officer, pipe sleeves with bells shall be laid with the bells facing in the direction of laying. The full length of each section of pipe sleeve shall rest solidly upon the pipe bed, with recesses excavated to accommodate bells, couplings, and joints. Pipe sleeves that has the grade or joint disturbed after laying shall be taken up and relaid. Pipe sleeves shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until joints are complete and ends plugged as necessary. When work is not in progress, open ends of pipe sleeve, and fittings shall be securely closed so that no trench water, earth, or other substance will enter the pipe sleeves or fittings. Where any part of the coating or lining is damaged, the repair shall be made by and at the Contractor's expense in a satisfactory manner. Pipe sleeve ends left for future connections and/or work shall be plugged, or capped, and anchored, as shown.

A) Piping Sleeve Connections

The connections shall be made by using specials and fittings to suit the actual conditions.

3.6.2 Backfilling of Pipe Sleeves

Backfilling shall be in accordance with the applicable provisions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, except as modified herein.

3.6.3 CLEANUP

Upon completion of the installation of pipe sleeves and appurtenances, all debris and surplus materials resulting from the work shall be removed.

3.6.4 Satisfactory Installation

The contractor shall submit a Satisfactory Installation statement signed by the principal officer of the contracting firm stating that the installation of the pipe sleeves is satisfactory and in accordance with the contract drawings and specifications, and the manufacturer's prescribed procedures

and techniques, upon completion of the project and before final acceptance.

3.7 STILLING WELLS

3.7.1 Steel Cover Plates and Frames

Steel cover plates and frames shall be of the type and size specified or shown on the drawings and shall be fabricated to accurately fit the supporting member. Openings shall be provided as shown on the drawings or as required. Steel cover plates and frames shall be galvanized after fabrication.

3.7.2 Locking Bars and Locking Boxes

Steel Locking Bars and Locking Boxes shall be in accordance with the details shown on the drawings and shall be fabricated to accurately fit the supporting member and member to be locked.

3.7.3 Ladder and Safety Cage

Ladder and safety cage shall be installed per manufacturer's recommendations.

-- End of Section --